

## PATENTS

Issued Nov. 12, 1935

2,020,460. REFRIGERATION. Dion Kanouse Dean, Rahway, N. J., assignor to Foster Wheeler Corp., New York, N. Y., a corporation of New York. Application April 20, 1933. Serial No. 667,010. 13 Claims. (Cl. 62-152.)

2,020,485. PRESSURE SWITCH. Hermon L. Van Valkenburg, Wauwatosa, and Josef Zeller, Milwaukee, Wis., assignors to Square D Co., Detroit, Mich. Application April 11, 1934. Serial No. 719,988. 13 Claims. (Cl. 200-83.)

2,020,492. GAS PRESSURE REGULATOR. Edward Zahm, Buffalo, N. Y., assignor to Zahm & Nagel Co., Inc., Buffalo, N. Y., a corporation of New York. Application May 24, 1934. Serial No. 727,336. 1 Claim. (Cl. 50-23.)

2,020,508. VALVE MOUNTING FOR REFRIGERATOR COMPRESSORS. Leland G. Knapp, Chicago, Ill., assignor to Montgomery Ward & Co., Inc., Chicago, Ill., a corporation of Illinois. Application June 25, 1934. Serial No. 732,225. 10 Claims. (Cl. 230-228.)

2,020,509. VALVE MOUNTING FOR REFRIGERATOR COMPRESSORS. Leland G. Knapp, Chicago, Ill., assignor to Montgomery Ward & Co., Inc., Chicago, Ill., a corporation of Illinois. Application June 25, 1934. Serial No. 732,226. 5 Claims. (Cl. 230-228.)

2,020,525. ROTARY PUMP, COMPRESSOR, AND THE LIKE. John Southern, London, England, assignor to Worthington Pump & Machinery Corp., New York, N. Y., a corporation of Virginia. Application May 10, 1934. Serial No. 724,884. In Great Britain July 1, 1933. 6 Claims. (Cl. 103-136.)

2,020,532. HEAT TRANSFER UNIT. Fred M. Young, Racine, Wis. Application June 30, 1933. Serial No. 678,348. 3 Claims. (Cl. 248-142.)

2,020,575. THERMOSTATIC DEVICE. Ronald J. Rockwell, Cincinnati, Ohio, assignor to The Crosley Radio Corp., Cincinnati, Ohio, a corporation of Ohio. Application April 21, 1932. Serial No. 606,709. 2 Claims. (Cl. 200-138.)

2,020,611. ROTARY MACHINE. Robert Talbot Knapp, Altadena, Calif., assignor of one-third to Rudolph A. Riek and one-third to Forest O. Riek, both of Los Angeles, Calif. Application Jan. 16, 1935. Serial No. 2,121. 13 Claims. (Cl. 103-139.)

2,020,638. REFRIGERATOR DRAWER. Arthur J. Feltault, Bloomfield, N. J., assignor to Efesem, Inc., New York, N. Y., a corporation of New York. Application March 18, 1932. Serial No. 599,671. 8 Claims. (Cl. 259-113.)

2,020,639. THERMAL INSULATION UNIT OR BOARD. Ralph V. Grayson and Edgar G. Ballenger, Atlanta, Ga. Application July 25, 1932. Serial No. 624,595. 8 Claims. (Cl. 154-44.)

2,020,654. CONTINUOUS ABSORPTION REFRIGERATING SYSTEM. Rudolph S. Nelson, Rockford, Ill., and Walter C. Davidson, North Canton, Ohio, assignors to The Hoover Co., North Canton, Ohio, a corporation of Ohio. Application Oct. 16, 1933. Serial No. 693,696. 9 Claims. (Cl. 62-119.5.)

2,020,695. HINGE. Edwin W. North, Rockford, Ill., assignor to National Lock Co., Rockford, Ill., a corporation of Delaware. Application Feb. 4, 1935. Serial No. 4,797. 6 Claims. (Cl. 16-148.)

2,020,696. HINGE. Edwin W. North, Rockford, Ill., assignor to National Lock Co., Rockford, Ill., a corporation of Delaware. Application Feb. 4, 1935. Serial No. 4,798. 4 Claims. (Cl. 16-148.)

2,020,763. REFRIGERATING APPARATUS. Alexander Bickers, Scheveningen, Netherlands, assignor to N. V. Naamloze Vennootschap Athano, Scheveningen, Netherlands, a company of the Netherlands. Application May 9, 1934. Serial No. 724,812. In Belgium May 11, 1933. 3 Claims. (Cl. 62-119.5.)

2,020,835. DEFROSTER SWITCH. Malcolm E. Henning, Des Moines, Iowa, assignor to Penn Electric Switch Co., Des Moines, Iowa, a corporation of Iowa. Application May 1, 1933. Serial No. 668,773. 10 Claims. (Cl. 200-83.)

2,020,836. SWITCH ACTUATING MECHANISM. Malcolm E. Henning, Des Moines, Iowa, assignor to Penn Electric Switch Co., Des Moines, Iowa, a corporation of Iowa. Original application Nov. 30, 1931. Serial No. 577,906, now Patent No. 1,962,506, dated March 12, 1934. Serial No. 715,125. 13 Claims. (Cl. 200-138.)

2,020,845. DOOR CONSTRUCTION FOR REFRIGERATOR CABINETS. William Marshall, Detroit, Mich., assignor to Briggs Mfg. Co., Detroit, Mich., a company of Michigan. Application Nov. 23, 1931. Serial No. 576,880. 3 Claims. (Cl. 20-35.)

2,020,860. REFRIGERATING APPARATUS. Jens Touborg, Greenville, Mich., assignor to Gibson Electric Refrigerator Corp., Greenville, Mich., a corporation of Michigan. Application Jan. 11, 1935. Serial No. 1,388. 8 Claims. (Cl. 62-115.)

2,020,946. REFRIGERATING DEVICE. Richard H. Jordan, Springfield, Mass., assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., a corporation of Pennsylvania. Application Aug. 25, 1933. Serial No. 686,762. 16 Claims. (Cl. 62-4.)

2,020,963. REFRIGERATOR COOLING TANK FOR DRINKING WATER. Robert H. Reid, New York, N. Y. Application Feb. 19, 1934. Serial No. 711,856. 11 Claims. (Cl. 62-89.)

2,020,987. COMPRESSOR UNLOADER. Russell W. Ayres, Schenectady, N. Y., assignor to General Electric Co., a corporation of New York. Application June 14, 1934. Serial No. 730,624. 8 Claims. (Cl. 230-138.)

2,021,047. ENDLESS FREEZING CONTAINER. Ralph H. Chilton, Dayton, Ohio, assignor to General Motors Corp., Detroit, Mich., a corporation of Delaware. Application June 12, 1933. Serial No. 675,418. 13 Claims. (Cl. 62-108.5.)

2,021,052. REFRIGERATING APPARATUS. Ernest Dickey, Dayton, Ohio, assignor, by mesne assignments, to General Motors Corp., a corporation of Delaware. Application March 25, 1929. Serial No. 349,796. Renewed July 9, 1932. 14 Claims. (Cl. 62-115.)

2,021,057. REFRIGERATOR DOOR. George E. Friedrich, San Antonio, Tex., assignor to Edward Friedrich, San Antonio, Tex. Application Dec. 4, 1933. Serial No. 700,929. 18 Claims. (Cl. 20-19.)

2,021,065. REFRIGERATOR DRAWER. Philip S. Hurlburt, River Forest, Ill., assignor to Watson H. Hurlburt, River Forest, Ill. Application July 10, 1933. Serial No. 679,605. Renewed April 3, 1935. 5 Claims. (Cl. 248-311.)

2,021,079. RESTRICTED FLOW DEVICE. William R. Mittendorf and Roland H. Money, Cincinnati, Ohio, assignors to The Crosley Radio Corp., Cincinnati, Ohio, a corporation of Ohio. Application April 23, 1934. Serial No. 722,049. 7 Claims. (Cl. 138-42.)

2,021,087. REFRIGERATING APPARATUS. George C. Pearce, Dayton, Ohio, assignor to General Motors Corp., Dayton, Ohio, a corporation of Delaware. Application Feb. 26, 1934. Serial No. 712,937. 9 Claims. (Cl. 62-4.)

2,021,090. AIR CONDITIONING SYSTEM. Clarence L. Ringquist, La Crosse, Wis., assignor to The Trane Co., La Crosse, Wis. Application May 22, 1935. Serial No. 2,742. 7 Claims. (Cl. 62-176.)

2,021,096. DOOR CONSTRUCTION FOR REFRIGERATORS. Allen A. Canton, New York, N. Y., assignor, by mesne assignments, to The Crosley Radio Corp., Cincinnati, Ohio, a corporation of Ohio. Application Nov. 2, 1932. Serial No. 640,871. 18 Claims. (Cl. 62-89.)

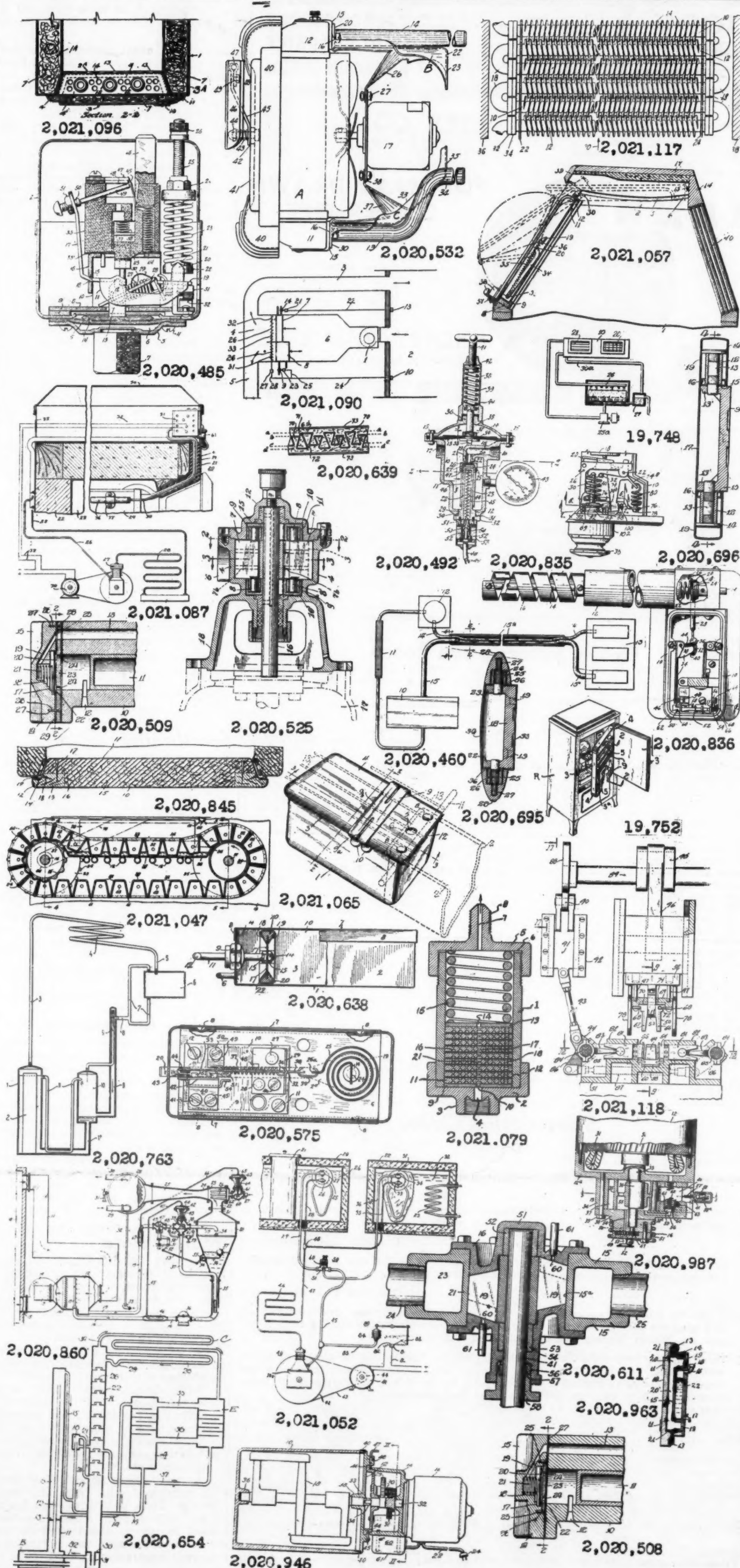
2,021,117. HEAT EXCHANGER. Charles E. Lucke, New York, N. Y., assignor to The Babcock & Wilcox Co., Bayonne, N. J., a corporation of New Jersey. Application March 21, 1931. Serial No. 524,252. 12 Claims. (Cl. 257-230.)

2,021,118. EXPANSION JOINT MAKING APPARATUS FOR ICE TRAYS. Guy L. Tinkham, Detroit, Mich., assignor to McCord Radiator & Mfg. Co., Detroit, Mich., a corporation of Maine. Application March 10, 1934. Serial No. 714,908. 17 Claims. (Cl. 153-13.)

## REISSUES

19,748. COOLING SYSTEM. Samuel M. Anderson, Sharon, Mass., assignor to B. F. Sturtevant Co., Inc., Boston, Mass. Original application Jan. 31, 1934. Serial No. 709,118. Divided and this application Jan. 12, 1935. Serial No. 1,524. Patent No. 2,007,291, dated July 9, 1935. This application for reissue Aug. 6, 1935. Serial No. 34,927. 2 Claims. (Cl. 62-117.)

19,752. REFRIGERATOR. Harold A. Glasser, Jackson Heights, N. Y., assignor to Bruno-New York, Inc., New York, N. Y., a corporation of New York. Original No. 1,927,398, dated Sept. 19, 1933. Serial No. 650,675, Jan. 7, 1933. Application for reissue Dec. 11, 1934. Serial No. 757,023. 5 Claims. (Cl. 62-89.)



**THE ANSUL TWINS**

**SAFE DRY**

**SULPHUR DIOXIDE**

**METHYL CHLORIDE**

**TARGET PRACTICE**

**ANSUL CHEMICAL COMPANY**

**MARINETTE » » » WISCONSIN**



## REFRIGERATION NEWS

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DETROIT, MICHIGAN, DECEMBER, 4, 1935

Copyright, 1935, by  
Business News Pub. Co.THREE DOLLARS PER YEAR  
TEN CENTS PER COPY**3 Areas Report  
Retail Sales for  
First 10 Months****48,657 Are Sold in 17 New  
Jersey Counties; 54,078  
by A. G. & E. Group**

Reports of electric refrigerator sales for the first 10 months of 1935 from northern New Jersey, Birmingham, Ala., and the territory served by Associated Gas & Electric System, indicate that sales in these sections of the country held up well past their usual seasonal levels.

**17 New Jersey Counties**

Distributors covering 17 northern New Jersey counties reported total sales of 48,657 units of refrigeration equipment for the first 10 months of the year. Of this amount, 45,713 were household electric refrigerators and 1,879 apartment size units.

Sales began their upward climb as early as March, when 4,507 units were reported sold by 10 distributing organizations. April showed 6,874; May, 7,627; June, 7,107; July, 6,598; and August, 5,344.

Month-by-month refrigerator sales figures were:

January	999
February	1,712
March	4,507
April	6,874
May	7,627
June	7,107
July	6,598
August	5,344
September	2,758
October	2,187

Commercial compressor sales during the 10-month period totaled 893, and water cooler sales, 172.

Counties covered were Bergen, Burlington, Camden, Essex, Gloucester, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren.

**Birmingham Sales Gain**

Sales in the Birmingham territory set a new record this year, both in number and in value. Unit sales totaled 7,776, for a dollar volume of \$1,242,395.

Four big months put the southern city's sales across, the period from April to August being responsible for more than 6,000 of the 10-month total.

Birmingham Electric Co.'s 50 per cent reduction in the price of electricity was a major factor in increasing the sales of refrigerators and other appliances.

Month-by-month sales figures, together with their estimated dollar volume, were:

January	118	\$ 23,600
February	317	63,400
March	782	132,940
April	1,281	203,070
May	1,531	236,385
June	1,374	202,991
July	1,066	169,811
August	738	123,347
September	322	54,740
October	248	42,160

**Associated Gas & Electric**

Sales by the company and dealers in the territory served by Associated Gas & Electric System totaled 54,078 for the first 10 months of this year.

May, June, and July were the banner months in AG&E territory. It was during this period that the organization's annual Jubilee Load Builders' Campaign was held. These three months alone brought more than 34,000 electric refrigerators to the company's power lines.

August sales held up better than in the past, totaling 5,061 units.

Company and dealer sales from January through October, as reported by A. E. Ward of Utility Management Corp., are as follows:

January	1,256
February	1,116
March	2,722
April	4,930
May	10,121
June	13,604
July	10,341
August	5,061
September	2,820
October	2,107

**Celotex Advertising  
Director Dies**

CHICAGO—Irwin S. Rosenfelds, 63 years old, for 10 years advertising director of the Celotex Co., died here Dec. 1. From 1903 to 1923, he was advertising director of Sears, Roebuck & Co.

**Distributors Hear  
Westinghouse '36  
Plans This Week**

MANSFIELD—Two hundred Westinghouse refrigerator distributors and field executives are attending a three-day session at the Westinghouse merchandising headquarters here this week, at which product and sales plans for 1936 are being outlined.

A. E. Allen, vice president of the company, is in charge of the meetings. Other factory executives on the program include:

R. E. Imhoff, sales manager; P. Y. Danley, manager of refrigeration and air conditioning; R. C. Cosgrove, manager, household refrigeration sales; S. D. Mahan, merchandise advertising manager; J. G. Baird, sales promotion manager; T. J. Newcomb, manager, commercial refrigeration sales; Roger Bolin, P. W. Endriss, R. R. Lynch, and P. C. Wilmore of the merchandise advertising department; A. J. Bodenmuller, household refrigeration sales department; V. E. Vining, director, department store sales; Vern C. Divine, department store supervisor, household refrigeration sales; L. K. Baxter, service manager; and A. G. Cruciger, commercial refrigeration sales.

Promotional plans for Westinghouse refrigerators will be the most extensive in the company's history, company executives will tell the distributors at the meeting.

**How Does Your Profit,  
Mark-Up, etc. Compare  
With Other Dealers?**

If you're a dealer, you'll probably be interested in knowing how your operating averages (net profit, overhead expense, mark-up, inventory turnover, etc.) over the period of a year compare with those of other dealers.

That's just what you can find out by turning to page 8 of this issue, on which is published complete data on the Dun & Bradstreet survey of the operating averages of 44 retailers of electric refrigerators.

Dealers surveyed are classified by volume of business, and population groups.

Also published on page 8 is an analysis by Don Park of the Crosley Radio Corp. dealing with another survey by Dun & Bradstreet covering dealers in various types of electrical appliances, instead of refrigerators only.

**Two Dealer Groups  
In Alabama Merge**

BIRMINGHAM, Ala.—Improved relations between utilities and independent dealers in Alabama was signified recently in the organization of the Electric Appliance Association of Alabama and West Florida with the following as temporary officers: J. S. Shaw, Moore-Handley Hardware Co., Birmingham, president; Neal Collins, Frank Tennille Furniture Co., Montgomery, vice president; and Marion Robertson, Alabama Power Co., Birmingham, secretary.

Early in 1934 a breach occurred when some of the independent dealers objected to a merchandise agreement between the TVA and the Alabama Power Co. which they claimed was to their disadvantage.

For a time there were two appliance associations in this area, one sponsored by the utilities and the other by dissenting dealers and distributors. But with the TVA out of the merchandise field, the utility has established itself as a firm friend of the independent dealers and the two associations have given away to the united body.

Permanent officers for the association will be elected in January at the time various distributors are having

(Concluded on page 2, Column 4)

**Two Florida Distributors  
Appointed by F-M**

TAMPA, Fla.—General Auto Supply Co. of this city and Railey-Milam, Inc., of Miami, Fla., have been appointed distributors by Fairbanks-Morse Home Appliances, Inc., K. McInnis, southeastern district manager for this manufacturing firm, reports.

**Grunow Officers  
Submit Plan of  
Reorganization****Creditors Committee Meets  
This Week; Grunow and  
Albers Made Trustees**

CHICAGO, Dec. 2.—A tentative plan of reorganization for the General Household Utilities Co. embodying a loan from the Reconstruction Finance Corp., the establishment of a revolving fund, and the retirement of the outstanding Federal Reserve Bank loan by officers of the company, was submitted to the creditor's committee today, reports O. M. Holen, secretary of the committee.

The committee will in all probability act upon the plan this week, Mr. Holen declared.

At a hearing Nov. 25 before Federal Judge Philip L. Sullivan the court appointed William C. Grunow and Charles H. Albers as temporary trustees for the General Household Utilities Co., with authority to continue with the operation of the business in the usual course of trade. Mr. Grunow is president of the company, but Mr. Albers, a Chicago business man, has had no connection whatsoever with the company.

The court order gives the trustees full and complete authority to conduct the business of the debtor and to incur such expense, and to make such purchases as are incidental to the operation of the business.

The creditors' committee has been advised by the management that all of the expenditures necessary to go into production on Grunow electric refrigerators have already been made, Mr. Holen declares.

After the creditors' committee has studied the proposed plan of reorganization, it will call a meeting of the creditors to be held within the very near future for the purposes of further considering the proposal, Mr. Holen states.

Members of the creditors' committee include E. M. Burke, Radio Corp. of America (chairman); W. E. Sargent, Cutler-Hammer, Inc.; C. C. Johnson, The Glidden Co.; James T. Watson, Meissner Mfg. Co.; Philip C. Lenz, Lenz Electric Mfg. Co.

**Distributors Preview  
1936 Grunow Line**

CHICAGO—Distributors of Grunow refrigerators convened here Nov. 25 to pre-view the 1936 line of household electric refrigerators manufactured by the General Household Utilities Co.

Presentation of 1936 models and promotion plans was made by William C. Grunow, president of the company. Dr. J. D. Jordan, research engineer and physicist, discussed mechanical features and innovations in the new line. Following the general meeting

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**New Jersey Dealers to  
Give Testimonial  
Dinner for FHA**

NEWARK—New Jersey dealers will hold a testimonial dinner for the Federal Housing Administration Jan. 18 at the Newark Athletic Club.

Harold W. Bush, general manager of the Electric Refrigeration Sales Co., Elizabeth, N. J., is chairman of the committee arranging the dinner. Other members of the committee include, Luke C. Gleason, sales manager of the Inter-County Investigating Co.; Emile Bacharach, general manager of the Fred Rosseter Co.; Max R. Ginsburg, general manager of Borok & Co.; and Todd Harrison Jr., general manager of E. A. Kirch Co.

Thomas E. Colleton, New Jersey state director of FHA, will be a guest of honor, and several Washington officials are expected to attend. Insured modernization loans made in the state by banking institutions and financing companies exceed \$12,000,000.

Invitations have been sent to banking institutions and financing companies handling FHA loans, as well as to distributors of electric appliances throughout the state.

**Edward Hughes Is  
Killed in Auto  
Accident**

EDWARD HUGHES

DETROIT—Edward Hughes, 48 years old, chief engineer of the commercial division of Norge Corp., and his wife Helen, 42, were killed Sunday afternoon in an automobile collision on U. S. Highway 16, just east of Howell, Mich.

The accident occurred when a car driven by William Dooley, 21, Lansing, Mich., slipped on the icy pavement and crashed into the Hughes machine.

With Mr. Hughes and his wife were their daughter, Mary Ann, who suffered fractures of both arms and

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**Parts Makers Meet  
Dec. 10 in Chicago**

DETROIT—Manufacturers of refrigeration parts and supplies will meet at 9 a. m. next Wednesday, Dec. 10, in the Palmer House, Chicago, to elect officers and directors, and to set up a program to promote the sale of products handled by refrigeration jobbers.

Invitations have been sent to about 250 manufacturers, and it is hoped that at least 50 of these will be represented at the meeting.

One of the things it is hoped to accomplish at the meeting, according to J. D. Colyer of Wolverine Tube Co., chairman of the temporary board of directors of the association, is the formulation of a skeleton policy to guide action of the organization as a whole, leaving manufacturers of individual parts to determine their own activities.

"It will be easier for each group of manufacturers to continue in its present policies than for the association to lay down definite policies by which all parts manufacturers should operate," Mr. Colyer said, in explaining the plan.

"The association will guide the groups, and keep them on an ethical basis, by picking out essential principles common to every manufacturer, which will serve as a general policy for the association."

In this way, manufacturers of various parts, who have their own peculiar distributive arrangements and methods, would be free to follow them for the most part, being subject to the general policy of the association, which would apply to all manufacturers.

"The association will be no stronger than the number of manufacturers who become part of it," Mr. Colyer said. "Unless we can get 35 or 40 manufacturers to join right away, it is doubtful whether we can afford the kind of secretary which such an organization would need."

Frank J. Gleason, formerly of Universal Cooler Corp. and now director of the Michigan Refrigeration Association, who was named temporary secretary of the association at the meeting here Oct. 23, will probably be elected permanent secretary at next week's meeting, Mr. Colyer said.

**Universal Cooler  
Profit for Year  
Totals \$47,481****Company to Market 1936  
Household Line Direct  
To Retail Outlets**

DETROIT—Universal Cooler Corp. reports a net profit, after deduction of all charges including Federal income tax, of \$47,481.07 for the fiscal year ending Sept. 30, 1935. This is equal to earnings of 72 cents per share on 66,178 shares of Class "A" stock outstanding, and compares with a loss of \$108,717 for the previous fiscal year.

Current assets were placed at \$546,381.05 and current liabilities at \$86,429.73, a ratio of better than 6-to-1. This compares with respective figures of \$926,419.83 and \$481,269.85, or not quite 2-to-1, a year ago.

The report issued by President Frank S. McNeal reveals that notes payable to banks were cut from \$200,000 to \$1,000, and that a long term note has been reduced from \$250,000 to \$200,000.

Sales of all Universal Cooler refrigeration equipment for the fiscal year were 34 per cent greater than sales for the previous fiscal year. The increase in sales for commercial units only was 27½ per cent, Mr. McNeal reports.

Coincident with the issuance of the report for the fiscal year, Mr. McNeal announced a change in Universal Cooler's sales policy to the extent that for 1936 the company will introduce a complete line of household electric refrigerators to be marketed under the trade name "Universal Cooler," and which will be sold only on a direct basis to retail outlets.

Appointment of new personnel to handle sales of the household line, headed by H. E. Markland in the capacity of sales manager, has been announced by Mr. McNeal during the past month.

Universal Cooler Corp. will continue its past policy of selling commercial refrigeration equipment direct to nationally known refrigeration equipment manufacturers.

The company will also continue with its policy of manufacturing household refrigeration systems for nationally known manufacturers and distributors.

The following were elected officers for the coming year:

F. S. McNeal, president; A. H. Sarver, vice president; Ford Ballantyne, vice president; Frederick C. Gielow, secretary; Charles E. Costain, treasurer.

Members of the board of directors are as follows: Mr. Ballantyne, Ralph A. Bard, J. B. Ford, Jr., Mr. Gielow, Charles H. Hodges, Jr., Herbert L. Chittenden, E. C. Lewis, and Mr. McNeal.

**Westinghouse Produces  
Water-Cooled Units  
For 'Enclosed' Places**

MANSFIELD—Westinghouse Electric & Mfg. Co. has added a new water-cooled Freon model to its line of hermetically sealed commercial condensing units.

By the use of this new unit, applications are now able to be made that in the past were impossible, claim officials of the refrigeration department.

Due to the hermetically sealed construction, it is possible to water cool the compressor, condenser, and motor. This feature permits the installation of this unit in closets, under counters or back bars, or in fully enclosed and out of the way locations. It is now possible to remove all the heat by the use of water, thus eliminating the necessity for ventilation required by units not hermetically sealed.

The unit is 24 in. long, 18½ in. wide, 11½ in. high, and can be built into a cabinet without the use of louvers, which, together with the quiet hermetically sealed construction, makes a desirable installation where noise is objectionable.

The ½-hp. motor is of the capacitor type, direct-connected to the two-cylinder compressor. The compressor has a bore of 1 in. and a stroke of ¾ in. Motor and compressor are electrically protected by the Westinghouse Spencer thermostat which protects

(Concluded on page 2, Column 4)



## Grunow Distributors Preview New Line

(Concluded from Page 1, Column 3) the distributors met in private conference with various officials.

Public announcement of the new line will be made at a later date.

Following is the list of distributors who attended the convention:

R. C. Hager, Arnold Wholesale Corp., Cleveland; Glen E. Sheppard and J. S. Ketchen, Air-Olo Radio Co., Inc., Huntington, W. Va.; Harry Alter, Arthur Alter, and Chick Mostow, Harry Alter Co., Chicago; Fred A. Wiebe and Norman S. Brown, Brown Supply Co., St. Louis.

Wm. J. Chesak, Car Parts Depot, Inc., El Paso, Tex.; R. E. Cloud and A. U. Cloud, Cloud Brothers, South Bend, Ind.; B. D. Colen, Colen-Gruhn, Inc., New York City; F. B. Connelly, F. B. Connelly Co., Seattle, Portland, Ore., and Spokane, Wash.; Clarence Pagel, C. C. Butchart, and Phil Begy, Buffalo Branch, Buffalo.

W. B. Davis, W. B. Davis Electric Supply Co., Memphis, Tenn.; E. M. Gresson, W. B. Davis Electric Supply Co., Little Rock, Ark.; H. H. Hansen, The Geo. H. Eberhard Co., San Francisco; J. R. Good and R. P. Good, Electric Appliance Distributors, Altoona, Pa.; George W. Fischer and G. E. Osborn, J. Geo. Fischer & Sons, Saginaw, Mich.

H. H. Lawson, Flat Top Supply Co., Bluefield, W. Va.; L. W. Green, Florida

## Conditioning Chief



JOHN R. HERTZLER

New manager of York Ice Machinery Corp.'s air-conditioning division, was previously air-conditioning manager of the company's New York branch.

Household Appliance Co., Tampa, Fla.; E. E. Forbes, E. E. Forbes & Sons, Birmingham, Ala.; A. K. Clifford, Front Co., Wheeling, W. Va.; W. C. Griffith and G. F. Hyde, Griffith Distributing Corp., Indianapolis; C. W. Hyde, Griffith Distributing Corp., Cincinnati; R. B. Young, Griffith Distributing Corp., Dayton.

E. L. Bozarth, Hughes-Bozarth-Anderson Co., Oklahoma City; R. W. Higgins, Kelley-How-Thomson Co., Duluth, Minn., and Millings, Mont.; J. R. L. Wilcox and J. B. Kemas, Kemp Equipment Co., Rochester, N. Y.; Vernon Maurer, Maurer-Greusel Co., Milwaukee; E. J. Goetze and H. A. Jantsch, Midwest Grunow, Inc., Kansas City.

G. J. Timmermann, Midwest-Timmermann Co., Dubuque, Iowa; B. J. Kerper, Midwest-Timmermann Co., Davenport, Iowa; J. C. Moore, H. Bird, Moore, Bird & Co., Denver; H. W. Lindahl and E. W. Turnley, Nashville Chair Co., Nashville, Tenn.; T. N. French, Jr., Peaslee-Gaulbert Corp., Louisville, Ky.

Henry Poll and C. H. Grove, H. Poll Electric Co., Toledo; Linwood Griffin, Radio Equipment Co., Dallas; C. C. Christianity and C. H. W. Merrill, Republic Distributing, Inc., Grand Rapids, Mich.; Moe Kreisel, H. Gabri- love, Shapiro Distributing, Inc., Washington, D. C.; C. L. Carper, C. Stuart, Sidles Co., Lincoln, Nebr.

M. J. Murphy, Sidles Co., Omaha; J. T. Neisler, Southern Equipment Co., San Antonio, Tex.; J. P. McMillan, Southern Radio Corp., Charlotte, N. C.; E. G. Newhall, Jr., Specialties Distributing Corp., Detroit; Francis Stern, Stern & Co., Inc., Hartford, Conn.

Park Street, C. J. Netting, Jr., and D. P. Steves, all of Steves Distributing Co., San Antonio, Tex.; W. J. Wilson and I. D. Watson, Watson & Wilson, Inc., Los Angeles.

Also represented were the following companies: Brown-Dorrance Electric Co., Pittsburgh; Grunow Northwest Sales Co., St. Paul; Morris Distributing Co., Albany, N. Y.; Oakley Electric Co., Boise, Idaho; Southwest Distributors, Wichita, Kan.; Tracy Wells Co., San Antonio, Tex.; and R. B. Wall Co., Wilkes-Barre, Pa.

## G-E Contest Sales Go Over Quota

CLEVELAND — The eight-weeks' fall sales drive of General Electric Co.'s specialty appliance sales division has ended with a national accomplishment of 125 per cent of quota, with sales exceeding last fall's drive by \$1,261,000.

The drive, known as the "Stock Market campaign," is an annual activity.

Leading all distributors in point of quota realization was George Patterson, Inc., St. Petersburg, Fla., with more than 300 per cent. B. K. Sweeney, Inc., Denver, was second with 250 per cent. Other leaders were Southern Appliances, Inc., New Orleans, 203.5 per cent; Electric Household Appliances, Inc., Dallas, 201.7; George Belsey Co., Ltd., Los Angeles, 199.2; Perry-Browne, Inc., Columbia, S. C., 194.2; Electric Appliances, Inc., San Francisco, 193.6; W. L. Thompson, Inc., Boston, 192.4; General Electric Supply Corp., Portland, Ore., 185.1; and Matthews Electric Supply Co., Birmingham, 178.4.

In the campaign, distributors were divided into 11 groups. Leaders of each group were named to the "board of governors" of the G-E "Refrigeration Stock Exchange." They were: Patterson, chairman; W. L. Thompson, Boston; S. C. Caswell, Detroit; R. E. Browne, Columbia, S. C.; B. K. Sweeney, Denver; Henry Ervin, Omaha; W. H. Kaiser, Boston; W. I. Hess, Indianapolis; O. F. Stuefer, Minneapolis; Warde Stringham, New Orleans; George Belsey, Los Angeles.

Salesmen will participate in cash prizes running close to \$200,000 as a result of the campaign, declares Jean DeJen, national campaign director.

Final weeks of 1935 will be devoted to the Christmas sales campaign.

## Bullock's Installs Larger Water-Cooling System

LOS ANGELES—Bullock's, large Los Angeles department store, has recently completed installation of an electrically refrigerated drinking water system in the eight interconnecting buildings which comprise its total floor space.

The installation has a cooling capacity of 400 gal. per hour, and water is circulated to 40 outlets on various floors of the store. Feeders model 33 temperature thermostatic expansion valves are used on the low side of the 7-hp. Freon system.

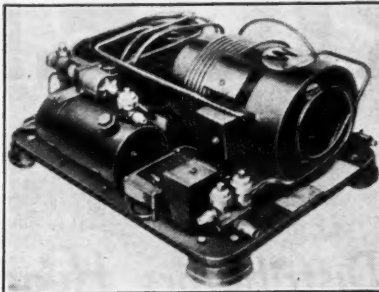
The valves are installed under cover plates at both ends of the insulated cooling tank, which was designed and built by the Day & Night Water Heater Co., Monrovia, Calif. High side and low side are located in a penthouse on the roof of one of the buildings.

## Many Milk Cooler Sales Financed by FHA

BURLINGTON, Vt.—Sales of electrical appliances and commercial refrigerating equipment under the modernization credit plan of the FHA, made by Robert Cartmell, dealer who operates in Middlebury, Rutland, and this city, will total between \$18,000 and \$20,000 for the present year, he declares.

The greatest part of this sales volume has been to farmers purchasing milk-cooling equipment, states Mr. Cartmell.

## New Freon Unit



This new water-cooled Westinghouse condensing unit can be used in enclosed spaces.

## New Water-Cooled Unit Built by Westinghouse

(Concluded from Page 1, Column 5) tects, shuts the motor off in the event of line trouble, and starts the motor after the trouble has passed.

The receiver on this unit is constructed of seamless steel tubing with welded end heads. The end head is equipped with a fusible plug to protect the entire system from explosion in case of fire. The fusible plug has a discharge temperature of 230° F.

This receiver is charged with 4 lbs. of liquid Freon at the factory and has a pull down capacity of 6 lbs. This permits the addition of 2 lbs. when the application requires, without the use of an additional receiver.

## Alabama Dealers Merge Into One Organization

(Concluded from Page 1, Column 2) their meetings introducing the new refrigerator models. Plans will be presented for the state's greatest cooperative sales campaign.

The association's executive committee is as follows: wholesaler group, Mr. Shaw, C. R. Matthews, Matthews Electric Supply Co., Birmingham; E. D. Henley, Birmingham Electric Battery Co., and R. P. McDavid, R. P. McDavid & Co., Birmingham.

Utility group: H. E. Cox, Birmingham Electric Co.; and J. S. Sutherland, Alabama Power Co.

Dealer group: Mr. Collins, A. C. Wade, Wade Electric Co., Florence; G. C. Faucett, Tuscaloosa; R. P. Warnock, Warnock Furniture Co., Anniston; Jesse Duke, Duke Furniture Co., Birmingham; R. B. Doyle, Phillips Furniture Co., Mobile; D. A. Walden, Walden Motor Co., Headland; and Clark Chavers, Chavers-Fowhand Co., Panama City.

## New Baltimore Dealer Sells Westinghouse Line

BALTIMORE—New dealer in this territory is the Household Appliance Co., at 3914 Eastern avenue.

This store, headed by B. Beerman, will handle the Westinghouse line of refrigerators, washers, radios, and other appliances.

## Edward Hughes Is Killed in Auto

(Concluded from Page 1, Column 4) one leg; Lucille Weing, Daggett, Mich., who suffered head injuries; and Evelyn Sprague, Englewood, N. J., who suffered a fractured pelvis.

Another daughter, Edna Louise, was uninjured. The girls are students at Olivet College, and Mr. and Mrs. Hughes were taking them back to school, intending to continue on to Marion, Ohio, to attend the funeral of Mr. Hughes' mother.

Mr. and Mrs. Hughes were taken to McPherson Memorial Hospital, where both died before 5 p. m., within an hour after being admitted. Mr. Dooley, driver of the other car, was not injured, and his companion, Andrew Diarich of Lansing, suffered minor bruises.

Mr. Hughes began his association with the industry with the Delco division of General Motors Corp. in the early days of the century, eventually becoming supervisor in the tool department there.

Later, he was on the engineering board of Detroit Aircraft Corp., being active with designing and construction of the ZMC-2, first all-metal airship. He also built the mooring mast at Ford airport.

For a time, Mr. Hughes also was engaged in the contracting business.

A college classmate of Louis Ruthenberg, president of Servel, Mr. Hughes joined him shortly after the former had become president of Copeland Refrigeration Corp., as works manager. This position Mr. Hughes held for about three years, after which he was named vice president of the company, in charge of manufacturing.

Next he was named Copeland's chief engineer. He came to Detroit in May, 1933, to become chief engineer of the commercial division of Norge Corp.

Funeral services were to be held at 3 p. m. Wednesday afternoon from Hamilton Funeral Parlors, 3975 Cass Ave., after which the bodies of Mr. and Mrs. Hughes will be taken to Rushville, Ind., for burial.

## Hartford Store Opens G-E Appliance Dept.

HARTFORD, Conn.—Use of the G-E talking kitchen, radio broadcasts over station WHIC, and double-page advertisement spreads in two Hartford newspapers heralded the opening of the G-E appliance department at G. Fox & Co., leading department store in this city.

Arrangement of this appliance section follows the lay-out designed by Victor Civkin, manager of the architectural department at G-E headquarters, Cleveland. Focal point around which the display models center is a complete G-E kitchen.

Frank L. Cashman, manager of the department, states that much customer interest was focused on the G-E waste unit designed to fit into the sink and electrically eliminate refuse.

**MCCORD**  
*Refrigeration*  
**PRODUCTS**

COMMERCIAL EVAPORATORS  
DOMESTIC EVAPORATORS  
CONDENSERS  
METFLEX ICE TRAYS  
SPIRAL FINNED TUBING  
AIR CONDITIONING SURFACE

MCCORD RADIATOR & MFG. CO. DETROIT

# CURTIS REFRIGERATION

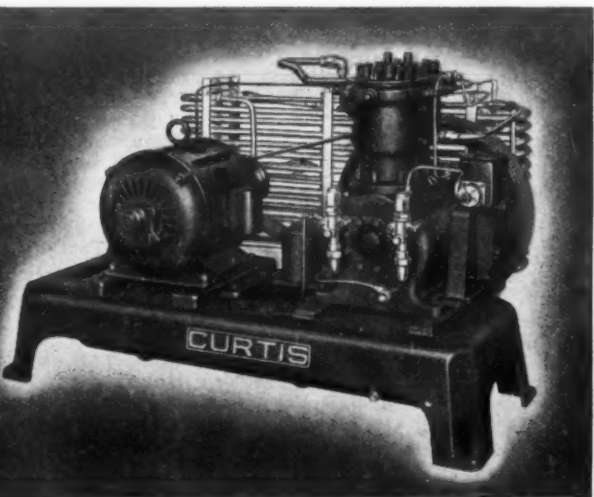
## Units to fit every need

Curtis, one of the oldest compressor manufacturers, offers an unusually complete line of refrigerating units— $\frac{1}{2}$  to 2 H. P. air cooled;  $\frac{1}{2}$  to 15 H. P. water cooled—reflecting 81 years of successful engineering, designing and manufacturing experience. Some desirable territories are still open for reliable distributors.

81  
SUCCESSFUL  
YEARS  
ESTABLISHED  
1854

Write  
for  
details.

# CURTIS



CURTIS REFRIGERATING MACHINE CO.  
Division of Curtis Manufacturing Co.  
1912 Kienlen Avenue, St. Louis, U. S. A.

## STEWART-WARNER

### SCOOPS REFRIGERATION NEWS

with  
**SAV-A-STEP**

Biggest Refrigeration Sales  
Feature for 1936

WATCH FOR EARLY ANNOUNCEMENT

# STEWART-WARNER



Big Things  
are Happening  
at Kelvinator!

And The Sales Plans  
write themselves!



Reading from left to right: V. J. MCINTYRE, Sales . . . G. M. EVANS, Vice-President, Manufacturing . . . H. W. BURRITT, Vice-President, Sales . . . V. C. WOODCOX, Advertising Counsel . . . G. W. MASON, President . . . H. W. NEWELL, Advertising Counsel . . . B. B. GEYER, Advertising Counsel . . . J. A. HARLAN, Sales . . . E. HEITMAN, Chief Engineer . . . E. A. SEIBERT, Service . . . G. STRELINGER, Sales . . . S. C. MITCHELL, Advertising . . . H. G. PERKINS, Vice-President . . . C. C. THOMAS, Engineering

When the product itself is an outstanding value . . .  
when it offers performance far beyond the common  
standard . . . when it embodies features of practical  
usefulness that no other refrigerator has . . . when  
it represents in its creation all the requirements of

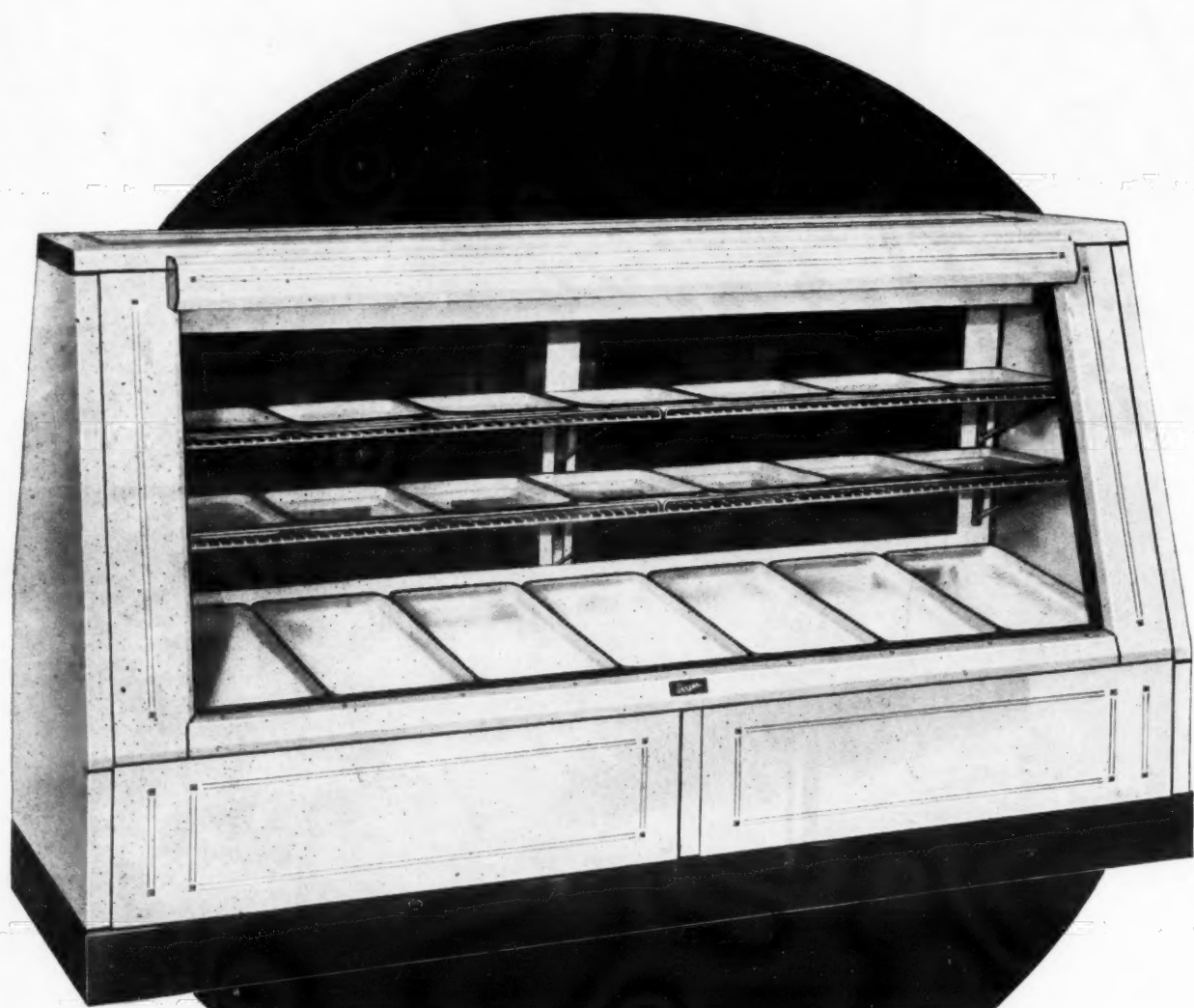
public demand . . . and the ideals of men planning  
for leadership . . . then, sales and advertising plans  
write themselves.

And such are the plans that Kelvinator has to offer  
to its distributors, dealers and salesmen for 1936.

# Kelvinator

The Only Electric Refrigerator in 1936 with the \_\_\_\_\_ !





# SERIES FIVE

BY

## Seeger

### All-Service Display Case - - -

The most popular Display Case ever built, because it has 1/3 more display than the usual case. An active salesman for Meat, Grocer and Delicatessen Dealers.

Seeger Series Five displays food attractively, while keeping it in perfect condition. Every modern convenience, as well as the very best of materials and construction are built into this case.

Series Five is sold through Dealers and Distributors of Electrical Refrigeration.

For Complete Details and  
Present Prices write

## SEEGER REFRIGERATOR CO.

Saint Paul, Minnesota

New York, N.Y.

Boston, Mass.

Chicago, Ill.

Los Angeles, Calif.

San Francisco, Calif.

Special Representatives:

Meyer Smith Co., Buffalo, N.Y.

Seeger-Philadelphia, Inc., Philadelphia, Pa.

### Manufacturers and FHA Will Present Series Of 'Home Shows'

WASHINGTON, D. C.—The National Home Show which will open in Baltimore Jan. 4 under the sponsorship of the Manufacturers Housing Display Council and the Federal Housing Administration is only the first of a series of exhibitions which are to be held the early part of next year in major market centers throughout the country.

The Manufacturers' Housing Display Council is comprised of a group of about 150 national manufacturers of building products and equipment. In each city in which shows are to be conducted, local real estate boards, better housing committees, and civic organizations will participate. Each show will be locally financed.

Second of these shows is scheduled for San Diego, and will begin Jan. 15 in connection with the reopening of the America's Exposition. Plans are under way to present National Housing Shows also in Kansas City, Philadelphia, Buffalo, Houston, Oakland, Miami, Minneapolis, Louisville, Milwaukee, Indianapolis, and Boston.

The FHA will furnish special exhibits and displays for all of the shows. Other exhibits will be limited to manufacturers of building materials and home furnishings.

The Baltimore show will also feature a completely furnished five-room cottage.

### Schneiderhahn Opens Davenport Branch

DAVENPORT, Iowa—A. A. Schneiderhahn Co., Leonard distributor with main offices in Des Moines, has just opened a wholesale and retail branch here.

The remodeled building which the distributorship is occupying has a striking modern black front with chromium and red glass trim.

Jack Helliwell is wholesale manager of the branch; Louis Wild, assistant manager; and Paul Henerlau, retail sales manager.

At the "opening week" festivities, 9,350 persons visited the store.

### Knight Named District Sales Head for McCray

KENDALLVILLE, Ind.—V. C. Knight, formerly manager of the Fort Wayne distributing office of McCray Refrigerator Sales Corp., has been appointed district sales manager in the states of Tennessee, Alabama, Mississippi, Georgia, Florida, North and South Carolina, and the New Orleans territory. The appointment was effective Oct. 28.

For several years, Mr. Knight was associated with McCray's sales department, as sales correspondent here. In 1932, he was placed in charge of the company's Fort Wayne office. He is especially well informed on machine equipment.

### Gas Assoc. Committee Is Headed by Gardner

NEW YORK CITY—New chairman of the Refrigeration Committee of the American Gas Association is B. H. Gardner, director of sales for the Columbia System, Columbus. He succeeds John J. Quinn, former chairman.

This committee will sponsor the national campaign on gas refrigeration in 1936. Plans will be formulated and presented at the committee's first regular meeting in January.

Mr. Gardner hopes to secure a total registration of 12,000,000 meters, which will be a 3,000,000 increase over the present meter total of 9,000,000, part of which is a direct result of the Prosperity Cup Contest conducted by Mr. Quinn.

### F-M Reports Higher Priced Radios Selling Better

BUFFALO—Higher priced radio models are selling better this fall than they have in the past several years, reports H. L. Bear, eastern district manager for Fairbanks-Morse Home Appliances, Inc.

Witkop & Holmes Co., recently appointed exclusive F-M radio distributor in this territory, has increased its pre-holiday sales through an advertising tie-in with one of the large Buffalo movie houses, Mr. Bear states.

### 42 Crosley Corsairs Sold To Army for C.C.C. Use

BALTIMORE—Forty-two Crosley Corsair Console radios have been sold by the Lincoln Sales Corp. to the Third Army Corps Area to be used in the CCC camps in that district. Under the terms of the contract, Lincoln Sales will supply additional Crosley sets.

### Potomac Power Co. Takes Dealer Paper Under FHA Setup

WASHINGTON, D. C.—Potomac Electric Power Co., under arrangements completed recently, is offering to dealers in the Electric Institute here, financial facilities for time payment sales of recognized electric appliances.

Intention is to purchase the contracts without down payment, and without recourse against the dealer selling the equipment.

Financing will be at rates approved by the FHA under the National Housing Act. Appliances eligible for financing under the present set-up are refrigerators, dishwashers, clothes washers, ranges, water heaters, air-conditioning equipment, furnace burners and stokers, and built-in electric kitchens.

Contracts may have maturities ranging from one to three years, and may range, in minimum amount, from \$50 to \$150, depending on the type of equipment. Large amounts may be financed under any of the maturities, and in certain instances longer contracts will be considered.

Financing is limited to contracts with customers of Potomac Electric Power Co. or Braddock Light & Power Co.

### Leonard Refrigerators Play Unique Role in Banishing Spooks

ALEXANDRIA, Va.—Fear of "spooks" in an one hundred year-old building here, which recently was remodeled into twenty-eight three and four room apartments, has been dispelled by the installation of modern equipment, including Leonard electric refrigerators, in every apartment.

All of the apartments have been rented in advance of the completion of the remodeling.

Built originally for a cotton mill more than one hundred years ago, the building has served as a brewery and a spark plug factory. The shell of the old building is used in the apartment.

Earl Rannels, Leonard salesman in Washington, D. C., convinced John Loughran, owner of the building, that an electric refrigerator would help get tenants. The sale of 28 refrigerators resulted.

### Dealer Celebrates Sale of Big Model with Parade & More Sales Result

MEDINA, N. Y.—If you were a dealer in a little town of 300 persons, and one day landed an order for a 23-cu. ft. refrigerator, what would you do? Go fishing? Bert Miller, Kelvinator dealer here, didn't, when he sold an SD-2332 to the Ridgeway hotel.

An alert merchandiser, Mr. Miller conceived the idea of a one-man parade, displaying the cabinet on a truck, with banners on all sides. He toured his whole territory, stopping at every restaurant, grocery store, market, and saloon, giving all of his potential purchasers a chance to look over the model.

Result, so far, is the sale of three domestic cabinets and two commercial installations. It was good business for the hotel, too.

### Connelly Appoints 3 to Branch Office Jobs

SEATTLE—Three men have been appointed to positions in the branch offices of the F. B. Connelly Co., appliance distributor of this city. They are: Frank T. Parker, S. W. Leach, and Frank Porter.

Parker, formerly Seattle branch manager of the Federal Truck Co., is credit manager of Connelly's Portland, Ore., office. Leach, new credit manager of the Seattle branch, was previously auditor for Ernst & Ernst, public accountants. Porter, new purchasing agent at the local office, was assistant manager of the General Motors branch here.

### 'Super-Companion' Range Introduced by G-E

CLEVELAND—Specialty appliance sales division of General Electric Co. is introducing the "super-companion" range, which is a combination of the G-14 and G-15 ranges into a single unit, providing two large super-speed ovens and six surface units.

The new model can be placed flush against the wall and adjacent cabinets. Ovens are vented through openings in the back splasher.

The combination range occupies a floor space of 39 in. wide by 24 in. deep. Height from floor to cooking surface is 36 in., and height overall is 45 in. The cooking top is 39 in. by 22½ in.



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L. C. WISWELL, Chicago Distributor . . . R. I. PETRIE, Leonard Sales Manager

# "Pete ... that will make Leonard the 'Hot Line' for 1936!"

"You told me that Leonard would be a sensational refrigerator in 1936.

"I believed it. But I didn't expect or even hope to see what I've seen today.

"Now I'm going back to Chicago and make new plans, big plans, plans to cash in on the greatest opportunity I've ever seen in the refrigerator business.

"Leonard is certainly going to be the 'hot line' for 1936."

L. C. WISWELL, *President*  
L. C. WISWELL CO., CHICAGO, ILL.





## Sales Idea of the Week

By V. E. (Sam) Vining, Director of Department Store Sales,  
Westinghouse Electric & Mfg. Co.

When you know what your knocking competitor is going to say—say it first.

That'll kill him.

A knocker feeds on ignorance and the inference that his competitor is hiding a weakness. If his competitor has hidden nothing, and stressed any point of weakness, the knocker is done before he starts.

When you are courting your girl—a selling job of no mean proportions for most of us—don't hide that bald head in shame.

Let it shine.

It may blind her to other faults. Mention it once in a while to show you are proud of it—

Then tell her about the hair on your chest.

Then when your competitor refers to you as "that bald headed gazakus" she smiles at his ignorance and wonders that she ever even considered trusting her innocent self to him.

And that applies to merchandise as well as love.

## Planned Follow-up of Promotion Movie Nets 2,200 Prospects & Sales Increase

KANSAS CITY, Mo.—Within three weeks after it had given four free matinees of general promotional value at neighborhood moving-picture theaters from which it obtained the names and appliance needs of 2,200 prospects, Midwest Electric Appliances, Inc., G-E distributor, sold \$20,000 worth of merchandise.

The sales organization is still getting the benefit of this planned effort. Over-all cost of each show approximated \$50.

These results have been obtained because H. C. Doss, sales promotion manager, insists that every plan for "general education" must be justified by immediate sales. If these cannot be calculated to follow, the plan goes into the discard.

Three specific steps were taken by Mr. Doss in this particular promotion: first, he arranged, announced, and held four shows; second, he so managed that of the 3,500 attending, 2,200 names and addresses of women interested in electric appliances were filed; third, the sales organization followed through by calling on these prospects and selling them.

"My idea about any sales promotion planned to attract the public at large," declares Mr. Doss, "is that 75 per cent of the benefit is lost unless you follow up with some device to get detailed information from the people who respond to the effort. They may come to your function, say everything is fine, then go home and forget it."

"So I have always tried to employ such a device. We always try to use some means of finding out what electric appliances the housewives already have, and what electric appliances they are interested in having."

"What I am saying applies to spe-

cialty dealers much more than to merchants who depend upon store traffic. You can display your merchandise superbly, but if you get rid of all your outside salesmen, you'll soon go out of business. People must be called on. They like to be called on, providing the calling is done with some finesse."

"In this specialty business you must get immediate action on any type of promotion, or find that your effort fades away into that pink cloud known as 'general education'."

Midwest built its campaign around General Electric's commercial film called, "Three Women."

Four matinees were put on in as many neighborhood theaters, the shows running two days apart in order that they might be properly managed. In each theater several trailer announcements of each matinee were run before the show.

These invited everybody to attend the dated matinee as guests of the distributor. The word "Free" was played up and a souvenir was promised every woman attending.

Printed invitations were sent to lists of selected prospects, saying that a new Technicolor feature picture, starring Johnnie Mack Brown and other stars, would be shown, together with a comedy, musical revue, and other attractions. Children under 15 could come if accompanied by parents.

Midwest arranged with each theater for a news reel, animated cartoon, and comedy to accompany each showing of the commercial film. These provided 35 minutes of extra entertainment.

The program ran in this order, which was important to the selling objective: 1, news reel; 2, cartoons; 3, musical revue in Technicolor to tie

in with the style of "Three Women," scheduled to follow.

Then came an important 10-minute break in the program, just before the showing of part 4, the commercial feature. According to plan, at this point the theater manager introduced Midwest's chief representative as host. The representative made it clear that a prize or souvenir would be given each woman present at the end of the show. That promise, of course, kept all the women in their seats until the final curtain.

Next he asked them if they wanted to see the grand prize. They did and they said so in chorus. This prize differed at each matinee. In one case it was a pressure cooker; in another, a covered roaster; at a third, a solid copper dresser set.

After showing the grand prize, the speaker announced that other representatives at the back of the theater would distribute and collect cards to be filled out by the women before receiving their prizes. The implication was plain: no filled out card, no prize.

Each blank card left a place for the name, address, and telephone number, and two columns of appliances to be checked. One column, after checking, indicated what electric appliances each woman was already using; the other, what new ones interested her, such as a refrigerator, range, washer, ironer, vacuum cleaner, or dishwasher.

No detail that would speed the program or help its purpose was overlooked. Short pencils had been made out of long pencils and four of these were passed down each row of theater seats, along with the cards. No woman could say she had nothing to write with.

While this was going on the running fire of talk on the stage was not allowed to lag. Before the awarding of the main prize, six recipe books were given away. In each case, the name and address of the recipient was announced. This particular phase is always interesting to a neighborhood audience.

In this fashion every woman in the house had a chance and incentive to fill out her card. The speaker told the men they were not expected to do anything but enjoy the show. After every necessary step had been taken, the speaker retired from the stage and the commercial film was exhibited.

When the show was over the women filed out and handed in their cards in return for the souvenirs promised. At one matinee the gift for each woman was a dust-cloth. Plate-scrappers and rug-tacks were used at other shows.

In the lobby of each theater a portable kitchen showing all six of the G-E household units was exhibited. These units, of course, were closely inspected by hundreds of women.

Names secured from these matinees were segregated according to the territories and given to the district managers, who turned them over to their salesmen, with instructions to follow through on the calls at once.

Quite a difference they found between these carefully built up calls and the ones they make under the ordinary cold canvass! In this case, each woman had been a guest of the organization. She had been given a good free entertainment, had been inevitably influenced by the commercial film and exhibit and had been given a souvenir.

"By no means the least of the benefits from our effort was the effect on the morale of our salesmen," says Mr. Doss. "In one week we had provided them with more real prospects than they could have developed for themselves within six months."

## Westinghouse Booklet Tells How FHA Is Used for Kitchens

MANSFIELD — Transformation of old kitchens into new, modern all-electric ones through use of the FHA financing plan is the subject of the Westinghouse promotion booklet titled "You'll Sing At Your Work," issued here recently.

Vivid with pictured kitchens designed to make life a song for harried housewives, this booklet is also rich in factual information telling how all-electric kitchens can be purchased for as little as 55 cents, 95 cents, and \$1.20 a day.

Reducing the purchase problem to its simplest terms, this booklet states that the housewife need only approve the plan and estimate drawn up by the salesman, allow Westinghouse kitchen planning salesmen to measure her kitchen and group equipment, and pay the small allotments, once the purchase has been ratified by the FHA.

A step-by-step set up by which the prospect can first buy her range, then add the refrigerator, electric dishwasher, and scientifically planned cabinets when it is convenient to do so, is also explained in "You'll Sing At Your Work."

Contrasted in the piece are all types of kitchens from the extremely old fashioned to rooms fitted from floor to ceiling with Westinghouse equipment.

## G-E 'Selling Formula Chart' Gives Key Factors for Demonstrations & Closing Of Sales of Different Appliances

CLEVELAND—A "Selling Formula Chart" which presents graphically the five important factors in making a sale has been issued recently by the General Electric specialty appliance department for use by salesmen.

Given as the five important factors in a sale are:

1. Prospect information which tells you about the prospect's needs.
2. Product information which tells you what values fit those needs.
3. The advantage-proof-action selling process that causes the customer to appreciate those values.
4. Commitments gained through appeals to buying motives that lead to buying decisions.
5. Complete commitments on each buying decision that result in sales.

### Planned Presentation

A chart concisely sets up the planned presentation on G-E kitchen appliances. Points under refrigeration include mechanism, control, cabinet, appearance, and interior. Those for the range are appearance, cooking surface, thrift cooker, construction, oven, and controls.

Appearance is placed first in the dishwasher presentation. It is followed by construction, control, drive, and extra features.

Six vital points in an appliance demonstration are enumerated as follows in the chart:

1. Make definite appointment.
2. Have preparations all made.
3. Summarize advantages of appliance again.

4. Explain each step of operation clearly.
5. Appeal to appropriate buying motives at each step.
6. Try often for commitments and the close.

### 14 Closing Methods

Tabulation of 14 closing methods which are invaluable to the appliance salesman sets up these factors:

1. Pointing out discomfort and loss occasioned by delay.
2. The double-question method.
3. The five-decision method.
4. Special time appeals.
5. Taking decision 5 (time) for granted.
6. The summary close.
7. The suggestion - of - ownership method.
8. Focusing appeals on one advantage.
9. Direct question.
10. The name-spelling method.
11. The typed-order method.
12. The contingent method.
13. The telephone hunch play.
14. The double-close method.

Pertinent points regarding "after sale" are found in the following five directions:

1. Congratulate your customer.
2. Introduce the customer to other members of your dealership.
3. Present helpful literature and explain use.
4. Ask for new leads by good suggestive sales methods.
5. Make follow-up calls for good will and additional leads.

## Card Inside a Vanity Case Will Notify Housewife Who Gets a Westinghouse Unit for Xmas

MANSFIELD—The housewife whose gift is an electric refrigerator purchased under the "Surprise Plan" of the Westinghouse Christmas campaign, will believe that big things come in little packages when she receives, Christmas morning, an attractive vanity case containing a notice that her refrigerator will be delivered later.

This plan of giving a compact instead of delivering the unit Christmas morning, believe Westinghouse officials, will accomplish three things—it will keep the gift a surprise, give the housewife a vanity case she will prize,

and enable the dealer who sold the unit to enjoy his Christmas morning at home—not out making rush deliveries.

The dealer can purchase boxed vanity cases containing cards at a low cost from his distributor. He then presents one to a purchaser and finds out when the unit should be delivered.

To tie-up with this plan, dealers may also obtain from the factory a set of radio spot broadcasts which will suggest the double-gift idea to the husband, and at the same time, put across suggestions to work up a Westinghouse gift-giving spirit.

## Commercial Salesman Gets Nice Household Order

LOS ANGELES—Selling commercial refrigeration equipment for domestic use is somewhat of a novelty, but Paul Davison of General Equipment Co., Lipman distributor here, thinks he has found a good market—in the homes of movie colonists.

General Equipment Co. recently made its first sale of this type, a Lipman model 32. The job has a capacity of 36 cu. ft., inside area, four doors, an ice cube capacity of 378 cubes every two hours, and a freezing tray which holds 50 lbs. of meat.

## Crosley Introduces New Electric Heater

CINCINNATI—A thermostatically controlled electric heater, Temperator, has just been introduced by the Crosley Radio Corp.

It is provided with a heating element, fan, and thermostatic control which automatically turns the heater on and off, keeping a constant temperature and shutting off the current when not required.

Due to its design, the case of the Temperator will not become too hot to touch; a metal grill at front and back protects the heating coils and fan.

Prepared to **LEAD AGAIN** in 1936!



**Copeland**

**Commercial REFRIGERATION**


COPELAND finishes a big year, well prepared for bigger achievement in 1936. More than ever, you will find Copeland a dominant factor in commercial refrigeration during the coming season. Our unit production department has been greatly enlarged. The big Detroit plant has every facility for the finest precision manufacturer. Look for big things from Copeland! A few territories open. Why not write us today?

**COPELAND REFRIGERATION CORPORATION**  
Manufacturers of a complete line of Household and Commercial Refrigeration  
Holden Ave. at Lincoln . . . DETROIT, MICH.

**Copeland**  
DEPENDABLE Electric REFRIGERATION.

**R-M REFRIGERATOR FINISHES**

*Challenge Comparison* FOR  
**APPEARANCE • COLOR  
DURABILITY AND ECONOMY**



**RINSHED-MASON COMPANY**  
5935 MILFORD STREET • DETROIT • MICHIGAN

**HOME OF R-M REFRIGERATOR FINISHES**



*We've got the range for '36*



# 1935-FRIGIDAIRE'S MOST SUCCESSFUL YEAR

**A GREAT ACHIEVEMENT THAT SERVES  
NOTICE OF THE OUTSTANDING  
SUCCESSSES THAT ARE TO FOLLOW**



**I**N 1935 more household Frigidaires were sold than ever before in a single year! . . . This spectacular ac-

complishment means a great deal—to you and to us. It proves that Frigidaire is more than ever the leader. It shows that we have the public's endorsement...that they believe in us....But, what is of greatest importance is the fact that out of this tremendous success comes the experience for the most convincing, the most dramatic sales story ever told. From these outstanding successes we have discovered a new way to sell. It's the smoothest, fastest, straightest road to greater sales volume ever developed. Yes, we've learned a lot from 1935—and we've got the range for '36. Frigidaire Corporation, Dayton, Ohio.

*You'll do better with Frigidaire in 1936!*



## STATISTICS

### Operating Averages of 44 Refrigerator Dealers Analyzed in Survey

NEW YORK CITY—Of the 44 retailers of household electric refrigerators whose 1934 operating averages were analyzed by the research and statistical division of Dun & Bradstreet, Inc., 32 were on the profit side of the ledger (with the average net profit being 9.94 per cent) and 12 were in the "red" for the year (with an average net loss of 6.67 per cent).

Material for the survey was obtained from questionnaires which were mailed to retailers in business in the

mark-up on cost of goods sold of 83.52 per cent.

Individual operating ratios were calculated by these formulas: net profit or net loss equals gross profit minus total overhead expense; total overhead expense equals total annual operating cost; gross profit equals net sales minus cost of goods sold; cost of goods sold equals beginning inventory plus merchandise purchases minus closing inventory; mark-up on cost equals gross profit divided by cost of goods sold; inventory ratio equals net sales divided by closing inventory.

Operating factors and overhead factors of both the profit and the loss groups of retailers are shown in Table 3.

In Table 2, which affords an analysis of operating averages by sales volume of the firms surveyed, it will be seen that the greatest net profit was shown by the dealerships doing a relatively small volume of business.

Apparent reason for their larger net profit is the greater mark-up on merchandise, according to the figures reported. This would indicate that competition is not so stiff among the smaller dealers, and that they are less likely to resort to price cutting.

The analysis of operating averages by population groups bears out the idea that the dealer in the smaller town, if he operates at a profit at all, apparently does so because of the higher mark-up he is able to get.

Also published on this page is a summary by Don Park, manager of Crosley Radio Corp.'s dealer department, of Dun and Bradstreet's similar survey of 170 retailers of major electrical appliances. It may be interesting to compare how operating averages of a retailer of a number of appliances compare with figures taken on sales of electric refrigerators alone.

### White House Program Leads Him to Order Similar Appliances

OMAHA—Desire to copy the recent "modernization of kitchen appliances" program in the White House at Washington, D. C., led a prospect to purchase Westinghouse equipment for the house he was building, states John Muldoon, salesman of the Sol Lewis Co., here, who made the sale.

Equipment installed in this prospect's new home consisted of two DL-78 Westinghouse refrigerators similar to those installed in the Westinghouse House of Tomorrow, and a range, washer, water heater, ironer, and other appliances.

Operating Factors	Averages of 32 concerns reporting a net profit for 1934	Averages of 12 concerns reporting a net loss for 1934
1. Net Profit, or Net Loss	9.94%	6.67%
2. Total Overhead Expense	33.81%	41.78%
3. Gross Profit	45.87%	33.85%
4. Cost of Goods Sold	54.13%	66.15%
5. Mark-up (on Cost of Goods Sold)	83.52%	49.84%
6. Net Sales to Inventory (Inventory Ratio) (Times)	7.57	8.49
<b>Overhead Factors</b>		
7. Salaries of Owners or Officers	7.59%	10.38%
8. Employees' Salaries and Wages	10.52%	14.04%
9. Rent	2.39%	3.54%
10. Advertising	1.24%	1.59%
11. Light, Heat, and Gas	0.74%	1.16%
12. Taxes	0.73%	0.66%
13. All Other Expenses	9.01%	8.50%

United States in January, 1935. Each questionnaire asked (a) beginning inventory, (b) merchandise purchases during 1934, (c) closing inventory, (d) 1934 net sales, (e) subdivisions of overhead, (f) location, and (g) line of business.

The dealers showing a profit had an average total overhead expense of 33.81 per cent, an average gross profit of 45.87 per cent, and an average

BRUNNER

Send for the New  
**REFRIGERATION CATALOG**

Eight Models of Compressors  
Forty-one Models of Highsides  
from 1/6 H. P. to 15 H. P.

BRUNNER MANUFACTURING CO.  
UTICA, N. Y.

### Table 1—Analysis of Operating Averages by Sales Volume

#### A. 1934 Operating Averages of 32 Concerns Which Reported a 1934 Net Profit

Analysis of Net Sales										Analysis of Overhead				
Net Sales Group	No. of Concerns	Net Profit %	Total Overhead %	Gross Profit %	Cost of Goods Sold %	Mark-Up %	Inventory Ratio (Times)	Salaries Owners or Officers %	Em-ployees' Salaries %	Rent %	Adver-tising %	Light, Heat, and Gas %	Taxes %	Other Ex-pense %
Over \$1,000,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
\$500,000 to \$1,000,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
250,000 to 500,000	3	1.70	29.80	31.50	68.50	47.13	17.60	3.90	9.30	1.50	2.11	0.20	0.40	12.40
100,000 to 250,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
50,000 to 100,000	5	9.70	30.84	38.53	61.48	63.86	6.64	6.38	10.83	2.76	1.87	0.47	0.55	7.80
25,000 to 50,000	5	7.56	30.98	37.54	62.46	61.97	6.98	8.47	10.58	2.17	1.07	0.93	0.60	8.68
10,000 to 25,000	14	10.65	33.74	44.33	53.67	84.39	7.66	8.19	11.24	2.47	1.13	0.77	0.69	9.33
5,000 to 10,000	3	19.00	30.20	49.20	50.80	98.87	7.80	10.10	3.30	1.50	.....	1.10	1.80	12.10
2,500 to 5,000	2	15.10	33.20	48.30	51.70	95.62	3.70	7.37	10.01	2.40	1.16	0.73	1.30	10.16
Under \$2,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

#### B. 1934 Operating Averages of 12 Concerns Which Reported a 1934 Net Loss

Analysis of Net Sales							Analysis of Overhead							
Net Sales Group	No. of Concerns	Net Loss %	Total Overhead %	Gross Profit %	Cost of Goods Sold %	Mark-Up %	Inventory Ratio (Times)	Salaries Owners or Officers %	Em- ployees' Salaries %	Rent %	Adver- tising %	Light, Heat, and Gas %	Taxes %	Other Ex- pense %
Over \$1,000,000 .....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
\$500,000 to \$1,000,000 ..	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
250,000 to 500,000 ..	2	1.20	39.70	38.50	61.50	62.80	9.70	.....	16.40	2.80	2.90	0.50	0.80	16.30
100,000 to 250,000 ..	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
50,000 to 100,000 ..	2	2.65	37.20	34.55	65.45	55.40	10.15	7.30	16.85	1.05	1.20	1.00	0.80	9.00
25,000 to 50,000 ..	3	0.50	20.80	28.90	71.10	42.70	10.90	11.50	2.50	1.80	1.00	1.00	0.10	2.90
10,000 to 25,000 ..	2	8.35	47.00	38.65	61.35	61.42	6.10	15.40	14.20	4.10	2.20	2.10	0.20	11.80
5,000 to 10,000 ..	3	12.10	43.65	31.10	67.90	45.64	7.76	10.16	15.75	5.83	1.40	1.23	0.87	5.25
2,500 to 5,000 ..	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Under \$2,500 ..	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

### Table 2—Analysis of Operating Averages by Population

#### A. 1934 Operating Averages of 32 Concerns Which Reported a 1934 Net Profit

Analysis of Net Sales							Analysis of Overhead							
Population (City, Town, and Village)	No. of Concerns	Net Profit %	Total Over- head %	Gross Profit %	Cost of Goods Sold %	Mark- Up %	Inventory Ratio (Times)	Salaries, Owners, or Officers %	Em- ployees' Salaries %	Rent %	Adver- tising %	Light, Heat, and Gas %	Taxes %	Other Ex- pense %
Over 1,000,000 .....	3	5.77	34.30	39.07	60.93	63.27	5.97	8.90	11.23	5.50	3.20	0.20	.....	6.75
500,000 to 1,000,000 .....	4	11.65	33.20	44.80	53.20	86.14	5.60	7.20	10.63	2.30	0.50	2.00	1.30	10.01
250,000 to 500,000 .....	4	1.15	37.80	39.37	61.63	64.71	11.65	8.13	12.75	1.90	0.93	0.83	0.90	11.80
100,000 to 250,000 .....	4	11.20	32.90	44.10	55.90	79.96	9.23	10.27	10.13	2.70	2.05	1.20	1.20	7.00
50,000 to 100,000 .....	3	18.20	28.20	46.40	53.60	86.20	4.30	3.80	12.00	2.50	1.80	0.40	0.60	7.10
25,000 to 50,000 .....	6	10.64	28.83	41.64	58.36	72.44	7.12	5.33	9.48	1.68	0.55	0.58	0.56	7.76
10,000 to 25,000 .....	5	10.98	30.10	42.27	57.73	71.83	7.30	9.37	7.37	2.17	1.45	1.90	0.35	8.60
5,000 to 10,000 .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2,500 to 5,000 .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Under 2,500 .....	3	12.80	32.05	44.37	55.63	80.64	5.17	3.20	9.57	3.00	1.63	0.57	0.30	13.75
New York City .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

#### B. 1934 Operating Averages of 12 Concerns Which Reported a 1934 Net Loss

Analysis of Net Sales								Analysis of Overhead						
Population (City, Town, and Village)	No. of Concerns	Net Loss %	Total Over- head %	Gross Profit %	Cost of Goods Sold %	Mark- Up %	Inventory Ratio (Times)	Salaries, Owners, or Officers %	Em- ployees' Salaries %	Rent %	Adver- tising %	Light, Heat, and Gas %	Other Ex- pense %	
Over 1,000,000	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
500,000 to 1,000,000	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
250,000 to 500,000	2	2.90	41.45	38.18	59.89	62.81	15.00	10.45	12.60	8.00	2.80	1.50	1.20	4.90
100,000 to 250,000	2	12.70	40.80	52.80	46.20	112.75	3.20	10.73	18.90	2.50	0.90	0.90	0.10	5.60
50,000 to 100,000	2	0.70	41.50	40.80	59.20	69.20	12.10	6.30	17.20	1.95	2.00	1.15	1.15	14.90
25,000 to 50,000	2	14.55	50.00	34.60	64.40	54.96	4.40	15.40	14.20	5.55	1.35	1.70	0.75	11.80
10,000 to 25,000	2	2.80	25.95	23.15	76.85	30.25	8.35	9.90	9.10	1.40	1.15	0.60	0.10	3.70
5,000 to 10,000	2	8.30	24.00	15.70	84.30	18.70	8.50	6.06	7.75	2.39	.....	1.17	0.70	7.16
2,500 to 5,000	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Under 2,500	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York City	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

### Don Park Analyzes Dun & Bradstreet Study In Terms of How Average Dealer Operates

By Don Park, Manager, Dealer Department, Crosley Radio Corp.

YOU have probably often wondered just how your business, as a radio or household appliance dealer, compares with the average.

Dun & Bradstreet's research and statistical division has just completed a survey of 170 retailers of electric household appliances, and the results allow the average retail dealer to check up and find out just how close his operations came to the average of those dealers who were operating profitably.

If you are an Average Electric Appliance dealer in the United States, you made a net profit of 8.46 per cent in 1934. Total overhead expenses amounted to 29.26 per cent. You made a gross profit of 37.69 per cent. Total cost of goods sold amounted to 60.91 per cent. Mark-up amounted to 66.74 per cent. Ratio of turnover in net sales to inventory was 7.52 times per year.

#### Overhead Was 29.26%

Your total overhead expense was 29.26 per cent. Salaries paid to owners or officials of your company amounted to 8.39 per cent; employees' wages, 9.41 per cent; rent, 2.96 per cent. Also included in overhead was 1.62 per cent spent for advertising, .93 per cent for light, heat, and gas; .82 per cent for taxes, and 7.19 per cent for all other expenses.

Dealers located in cities having over a million population showed the greatest percentage of net profit. Their average net profit of 12.81 per cent was almost double that of the dealers located in cities with five hundred thousand to one million population. They also had the largest gross profit, 40.14 per cent.

The class of dealers with the next

most profitable operation were the dealers located in towns of 2,500 to 5,000 population, with an average net profit of 9.43 per cent.

Dealers located in cities of 50,000 to 100,000 showed the greatest amount of turnover. These dealers turned over their stock 10.21 times per year. They also showed a comparatively low overhead expense average.

Almost all of the dealers who lost money showed a percentage of overhead that ran between 38 and 44 per cent. Almost all of the dealers who made money showed a percentage that ran between 28 and 34 per cent.

All of the group of dealers who made money showed a mark-up of between 64 and 83 per cent. Almost all of the dealers who lost money showed a mark-up of between 33 and 62 per cent.

Nearly all of the dealers who made money held their miscellaneous expense items to between 5 and 9 per cent of their volume. Almost all of the dealers who lost money let their miscellaneous expenses run up to 10 or 12 per cent of their volume.

Almost all of the dealers who made money showed a gross profit of between 37 and 40 per cent. Nearly all of the dealers who lost money made a gross profit of between 28 and 32 per cent.

It is significant that out of the 170 dealers upon which this report was based, 78.24 per cent made a profit. This evidently shows that things are on the upturn among electrical appliance dealers.

The dealers in this analysis group themselves into two major groups, showing two distinct methods of operation. The group of dealers who do from \$250,000 to \$1,000,000 worth of

business a year are in the first group, and the dealers who do less than \$250,000 worth of business per year are in the other group.

The big operators had a gross profit of 29.55 per cent, and turned over their stock on an average of a little better than 10 times per year. Their average mark-up was around 42½ per cent and total overhead expense amounted to around 24 per cent of their volume. This group is evidently located in trading centers where there are opportunities for larger turnovers and where price is the dominating factor.

The other group of dealers made a greater average net profit but are probably located where the opportunities for a large volume of business are not so great; therefore, the second group is doing a very profitable and satisfactory business, maintaining prices, and selling on a basis of quality and service.

#### Averages of Group Two

Group number two showed an average mark-up of between 60 to 76 per cent, the turnover between 4 and 9 per cent, a gross profit of between 36 and 39 per cent and a total overhead expense of 29 to 31 per cent.

Among the big operators who lost money, poor management which resulted in too high a percentage of overhead seems to be the principal factor in their failure. Salaries for both executives and employees are too high.

Among the smaller dealers who lost money, insufficient mark-up seems to be the principal cause, although total overhead with too high a percentage for salaries of officials and employees is also a contributing factor.

This survey can be helpful to you in analyzing your business. You can use it as a measuring stick to find out whether your own operations compare favorably with the operations of hundreds of dealers in the United States who made money in 1934.

# The

# ANSUL

# Twins

## 60

## DISTRIBUTORS TO SERVE You

No matter where you are located there is an Ansul warehouse nearby carrying complete stocks of Ansul analyzed Sulphur Dioxide and Methyl Chloride. Write today for the location of the nearest distributor.

ANSUL CHEMICAL COMPANY.

MARINETTE . . . . . WISCONSIN



# Research—a *fundamental* Means to an end

... *getting facts is never an end in itself*

THE true function of advertising research is apt to become blurred in these complex times. Too often, it assumes an academic importance which loses sight of its fundamental task—that of getting new facts about markets and merchandise from which to evolve great selling ideas.

*How to find out* often over-shadows *what to find out*. But Lord & Thomas always remember that *getting facts* is not an end in itself, though we yield to none in our recognition that fact-finding is a fundamental means to our ends.

## Where Facts Are Found

Facts from which great Reasons-Why are sifted may be found *outside*, as well as *inside*, a client's business. And in the fundamental research which yields these facts, Lord & Thomas delve deeply in many fields.

We believe, for instance, that we are unique for our "liaison" between science and advertising. Many of our most successful campaigns result from facts gathered through personal contact with men in scientific centers, laboratories, hospitals and universities.

Lord & Thomas' ability to get significant facts—*fast*—without involving either a client or ourselves in costly procedure, comes from *knowing exactly where to go*. Every Lord & Thomas office has developed a technique whereby its research is proportioned not only according to population, but according to incomes, occupations, sex, age and race. This makes it possible for us to get our facts with a minimum number of calls.

## Here is an Example

We recently completed a national survey for a maker of a small popular-priced packaged article. We interviewed 13,000 consumers in 80 cities, from coast to coast. The time allowed us was three weeks—in which we had to make the survey, plan

it, organize trained investigators, collect returns, tabulate and analyze them. We had one of the largest independent research organizations in the country estimate on the job. They said, "\$7500—but it can't possibly be done in three weeks."

Lord & Thomas' own Research Department did the job in less than three weeks, at a cost of less than \$4000. And from its facts came a *Reason-Why* that was at once new, compelling and exclusive.

## Research Reveals Every Detail of our Client's Business

Lord & Thomas seek to know every detail of a client's business. His manufacturing, merchandising and distribution are subject to our constant study—from the *outside viewpoint*. We seek to know, personally, the key buyers and policy-pioneers in every line of trade affecting our clients. We contact them regularly. And we have scores of devices for keeping in tune with shifting buying habits, brand preferences, price policies and trade practices.

## Rich By-Products Often Revealed

The getting of these facts is tremendously important. Not only for the ultimate great *Reason-Why*, but for the mine of helpful suggestions which so often reveal themselves as rich by-products for the advertiser. And yet—research can never be more important than as a *fundamental means* to this end: that of sifting these facts for the *one great selling idea* on which success in advertising mainly depends.

This *selection* is the big fundamental in all advertising research. It is also the rare and difficult. But it is a working principle at Lord & Thomas—a *tested principle* born of experience. For we have invested \$180,000,000 for our clients in advertising during the last five years of depression alone.

# LORD & THOMAS · *advertising*

There are Lord & Thomas offices in New York; Chicago; Los Angeles; San Francisco; Toronto; Paris; London.  
Each office is a complete advertising agency, self-contained; collaborating with other Lord & Thomas offices to the client's interest



## ELECTRIC REFRIGERATION NEWS

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## Proposal: An All-Industry Exposition

**B**UILDING activities are expected to provide the basis for the next American Industrial Boom. During the last six years new construction work has been virtually at a standstill. Industrial and office buildings in that period have become obsolete and even unsafe. Apartment houses have become rickety and musty. And the shortage of new homes—especially since the 1935 tidal wave of marriages—has become noticeably acute in almost every city in the country.

While construction companies may have remained idle during the depression, laboratories haven't. New materials, new uses for old materials, new ideas in design and fabrication, new colors, new conveniences, and—most important of all—air conditioning, have been developed during this lull in active construction. When the building boom does begin, the structures which will go up no doubt will be so much further advanced than existing structures that the period of obsolescence of still useful buildings will be hastened materially. By the time the boom has run its course, we should be looking out upon something akin to a new world.

Those close to the Administrative picture in Washington and the financial picture in Wall street are openly predicting that this building boom will get under way in the latter part of 1936 and the forepart of 1927, and that it should continue in full swing at least until 1940. Many of the government's best-heeled alphabet agencies—PWA, FHA, HOLC, and even RFC—will collect their resources to concentrate on bringing about such a boom. Manufacturers and industrialists are preparing to join this movement by engaging in huge cooperative and individual advertising and promotion campaigns.

All this, quite naturally, will be right down the alley of the electric refrigeration and air-conditioning industries. Air conditioning, especially, should benefit by the coming building boom. Of all the advances which have been made in the art and science of constructing homes, offices, and factories during the last few years, none remotely approaches that of air conditioning—both in usefulness, and in the public fancy.

Right now the industry should be preparing to consolidate its gains in this direction, and to take the fullest advantage of the trend. The spotlight of public attention should be focused on air conditioning as being the dramatic feature of all new construction. It should be made clear to the public that **NO NEW BUILDING SHOULD BE PUT UP WITHOUT ADEQUATE AIR CONDITIONING**, and that all present structures in which human beings live and work are obsolete unless they have been properly air conditioned.

As a means of dramatizing this all-important idea, **ELECTRIC REFRIGERATION NEWS** suggests that every factor in the refrigeration and

air-conditioning industries join for the purpose of staging an All-Industry Refrigeration and Air-Conditioning Exposition during August, September, and October, 1936. Place: Detroit. These months are suggested because they immediately precede the generally predicted time of the building boom's start (and should afford plenty of time for preparation, if the industry begins thinking now in terms of what could be done along this line). Detroit is suggested because it comes close to being the geographical center of the refrigeration industry, and because it is leading all cities of the nation in industrial activity and recovery.

Foremost in this proposed exposition, of course, would be model homes and buildings, completely air conditioned. Let the public see that air conditioning is **HERE**, that it is an accomplished fact, and not just something that "will be mighty nice one of these days." All types of equipment should be in operation, with trained lecturers in attendance to explain just "how it works."

Movies, demonstrations, visual education of every description should be provided, so that the mystery can be taken out of air conditioning for Mr. John P. Citizen. People should be able to see, feel, understand, and buy air-conditioning and refrigeration equipment at an exposition of this nature.

Property owners and renters should be given the feeling that in order to protect their investments they should install air-conditioning systems and refrigeration in the dwellings they control. Most important of all, every person who visits the exposition should go home with the idea firmly implanted in his mind that any human habitation built from now on **MUST** be air conditioned.

Naturally it will not be expected that vast numbers of PROSPECTS will come to Detroit to view this exposition. No doubt thousands will; but the comparative inability of property owners from Miami or San Diego to get to Detroit for the show will not dismay manufacturers. The **TRADE** will get there, and it is upon contractors and dealers that manufacturers must depend to get their story across to the public. If the exposition did nothing else but educate the nation's dealers—who can then go back home and set up less pretentious exhibitions of their own—it will have been well worth staging.

As a chance to do a master educational job—results of which should show up big in the sales figures of the air-conditioning and refrigeration industries in the years following 1936—such an exposition seems to afford an opportunity so timely that these related industries cannot afford to neglect it. Editors of the **NEWS** invite correspondence on this subject, with a view toward the development of the idea.

## WHAT OTHERS SAY

### Motor's Public Relations

**N**O industry guards public goodwill more jealously than do the manufacturers of automobiles. They appreciate the necessity of maintaining public relations on a favorable basis, and have successfully met and overcome enough difficult situations in the recent past to demonstrate how vital the favorable attitude of the public is when the industry is under attack or answering criticism.

The fact that the new program of national automobile shows, the first of which is now under way in New York, will tend to equalize the production curve and spread employment over a longer period than heretofore, is being properly capitalized by the industry in calling attention to the advanced showing of 1936 models.

The public is properly interested in the economics of the motor car industry, because that industry is a leader not only in aggressive development of markets, but also from the standpoint of financial and production policies. That the manufacturers of motor cars have seen the desirability of meeting the only reasonable criticism which has been leveled at their employment methods, that of too great irregularity, is significant of their attitude toward the public which supports employment by purchase of automotive products.

Donald D. Davis, president of General Mills, Inc., commenting on the need of better public relations as a support for industry's attitude on legislation and other matters affecting it, says, "We have not yet succeeded in conveying to this nation of customers the basis for public understanding of modern business."

This is generally true; but the automotive industry has made such remarkable progress toward the goal of sympathetic public understanding that it might well be regarded as a model for other groups which have similar problems.—*Advertising Age*.

## LETTERS

### No Service Price War In Des Moines

Refrigeration Service Repair Co.  
Installation—Maintenance  
1433 West Walnut St., Des Moines

Editor:

I noticed an article about H. E. Sorenson in the Nov. 6 edition of the **News** regarding a price cutting war being waged in Des Moines by service companies and how he won the battle. I am personally acquainted with Mr. Sorenson, I like him very much, and he is a swell guy, but I believe he has expanded his chest too much regarding price cutting in this vicinity.

It is true we have had contract chiselers and graduates from refrigeration schools who do work for little or nothing to get the training they desire but I still say "no price war." Legitimate service companies profit from these "free for all" or fly by night individuals, but I do not condemn a man for trying to make an honest living.

The following service companies held a meeting last Monday night to establish prices on labor, refrigerant, oil, and exchange prices on float and expansion valves, and tubing.

Automatic Refrigeration Service, Electric Refrigeration Service, Refrigeration Service Co., Melvin Hass-Norge & Majestic, Refrigeration Service Repair Co., and W. G. Moore Service Co. B. F. WOOD.

### Cooling for Penney Store

Milwaukee Electric Ry. & Light Co.  
Public Service Building  
Milwaukee, Wis.

Editor:

In your issue of Nov. 6, 1935, under "Air Conditioning," on page 14, you have a copy of the list of installations made in Milwaukee which was sent you some time ago.

Upon looking this over, we note that under hotel guest rooms you have one installation of 135 hp. This is an error as this installation is not in guest rooms in a hotel but in Milwaukee's first air-conditioned department store, a new building which is being occupied by the J. C. Penney Co.

We assume that you understand that the horsepower which you show is not the total horsepower for the installations but that it is the horsepower in connection with the refrigeration; i.e., the compressors only. Also, that the horsepower of the fans, pumps, etc., is not included in the figures which you have reprinted.

This error does not, of course, make any difference to us. We are simply calling it to your attention that it may not be repeated in future installation reports as we know you would like to be as accurate as possible.

C. H. RANDOLPH.

### 'Bread & Butter Letter'

The Merkel Brothers Co.  
Plumbers Steam and Refrigeration Supplies  
Burbank St. and C.L.&N.R.R.  
Cincinnati

Publisher:

I think it is customary when one has been a house guest in the home of a friend to write a "bread and butter letter."

The unique and very generous hospitality extended by you and your associates to the Refrigeration Supply Wholesalers at the time of their Organization Meeting I feel merits at least a personal word of appreciation from me as one who enjoyed it immensely.

I am sure that the hospitable atmosphere in the home of **ELECTRIC REFRIGERATION NEWS** was helpful to manufacturers and wholesalers alike in the labors incident to the formation of a new organization.

HENRY W. MERKEL.

### Detroit Code of Ethics

A. J. Orbach, Inc.  
415 Park Ave., Plainfield, N. J.

Editor:

The writer would greatly appreciate copy of the Code of Ethics that has been drawn up according to your article of the Nov. 13 issue.

We consider your publication the greatest single help of anything we have in our refrigerator business.

A. J. ORBACH, Mgr.

Answer: Frank Gleason, secretary of the League here which drew up the Code of Ethics, says that the six points which we published constitute the entire code.

### Liked Kold-Hold Data

Los Angeles Automotive Works, Inc.  
1020 Towne Ave., Los Angeles

Editor:

We appreciate very much Mr. Greenlee's article on the operation of Kold-Hold units, printed in your issue of **ELECTRIC REFRIGERATION NEWS** Oct. 30.

Will you kindly forward to this company six copies of this issue?

D. H. ROBERTSON, Mgr.

### Cleveland Exhibit

Continued to Dec. 31

Electrical League  
Builders Exchange Bldg.  
Cleveland, Ohio

Editor:

We wish to correct statement which appeared in **ELECTRIC REFRIGERATION NEWS** on Nov. 20.

The Electrical League has not discontinued its exhibit, but will do so on Dec. 31, 1935. R. H. JONES, Secretary.

### Los Angeles Jobber

Recovers from Accident

The Starr Co.  
Richmond, Ind.

Nov. 18, 1935.

Editor:

Most certainly regret that I was unable to attend the jobber meeting in Detroit and meet with a number of my old-time friends, as well as make many more new ones. However, burns such as I received are rare and I am very happy to be back on my feet even though I am still hopping.

This accident occurred at Valley Junction, Iowa, Oct. 13, and was occasioned by a crust breaking through into some dryer dust, which exploded when the oxygen contacted the heat. Progress of recovery has been normal and I anticipate being able to return to the coast via automobile through Missouri, Arkansas, Texas, Arizona, California, and into Los Angeles.

RAY STRAHAN.

### Service Information for

A Visitor from Sweden

General Electric Co.

1635 Broadway, Fort Wayne, Ind.

Editor:

On Oct. 30, J. L. Roth, manager of the service department of Rex Cole, Inc., in New York sent you a purchase order for a **MASTER SERVICE MANUAL** to be sent to me direct to Stockholm, Sweden.

I am at present going through a special course of study in refrigeration before leaving for Sweden and am spending about three weeks with the General Electric refrigeration engineering department here at Fort Wayne. I refer to the Nov. 20 issue of the **ELECTRIC REFRIGERATION NEWS** page 11, and I would like to get the reprints of Mr. Newcum's articles and also the reprints mentioned under No. 2. Furthermore, I am interested in a subscription of the **News** and I notice combination rates on page 15 with a rate of \$7.50 for the **News** and one book.

In Sweden I will take up sales activities in commercial refrigeration and also some household equipment and will be connected with the Scandinavian representatives for the I. G. E. Co. If you have any suggestions as to useful literature and/or contacts I can make with American manufacturers in this line I would appreciate your information.

N. O. CARLSON.

### Biographical Error

In a News Story

Miller Conditionair, Inc.

1138 S. Broadway, Los Angeles

Editor:

Thank you very much for the article in the Nov. 6 issue of **ELECTRIC REFRIGERATION NEWS**.

However, there is one correction which I would like to mention, and that is the fact that I was not an instructor of engineering at the University of California. If there is any chance to correct this statement, I would appreciate it very much.

J. H. MILLER.

### Wants Patterson Book

Roanoke Gas Light Co.

121 Church Ave., S. W., Roanoke, Va.

Editor:

We have noted comment in the Nov. 20 issue of your publication, regarding the Patterson story. Will you kindly advise us when this book is published?

C. W. MERRIAM, JR.,  
Dist. Commercial Manager.

### Toxicity Article for

Use of Service Men

Central Maine Power Co.

Augusta, Me.

Editor:

I would like 20 copies of page 9 and 10 of your **ELECTRIC REFRIGERATION NEWS**, issue of Nov. 20, 1935, containing an article by Higley on "Toxicity of Gases."

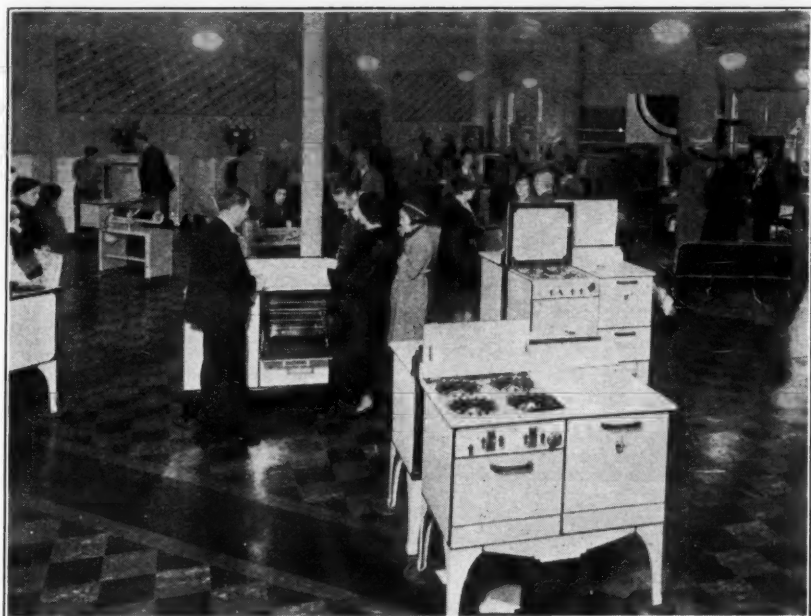
I want these for our service men.

E. P. NOYES,  
Director of Safety.

"Please don't miss sending the **REFRIGERATION NEWS** for I think it has very valuable information in it. I am very much interested in the **News** for I think it has, and explains all the latest developments in the refrigeration field. Enclosed is my check for one year's subscription for **ELECTRIC REFRIGERATION NEWS**."—Frank J. Karl, 4916 Harney Ave., St. Louis, Mo.



## A New Showroom Is Opened



Spacious and modern is the interior of the A. A. Schneiderhahn Co.'s new branch store in Davenport, Iowa. They handle Leonard's line.

## Sales in 'Carnival' Week Are Best in 3-Year Period

ST LOUIS—Opening week in the "Carnival Sale," promotional stunt featured in the appliance department of the Wellston Furniture Co. of this city, which handles Gibson refrigerators and other appliances, brought in sales that made this the best week the firm has had in three years, officials of the company report.

Brightly colored decorations and pictures of clowns, animals, and circus figures were used to carry out the carnival idea in both the window displays and in the appliance department. These decorations formed a setting for the appliances displayed.

A prize drawing, at which small appliances were awarded to lucky ticket holders, was held at the close of the sale. Ballots for the drawing were obtained through purchases—the number of ballots being governed by the amount of the purchase.

## McCray Names Bolton District Sales Head

CLEVELAND—J. N. Bolton, formerly manager of the Cleveland branch of McCray Refrigerator Sales Corp., has been promoted to the position of district sales manager for the states of Ohio, Kentucky, and West Virginia.

Mr. Bolton joined the McCray organization in 1931, as a salesman with the Toledo branch. In 1932, he was named manager of the Cleveland branch office, holding this position until his present promotion, which became effective Oct. 1.

## 'Cooked in Cellophane' Dinner Will Feature Hotpoint Exhibit

CHICAGO — Promotion feature which the Edison Electric Appliance Co., Inc., will employ at the First International Housewares show in the Merchandise Mart here, is a "Cooked in Cellophane" demonstration.

In this stunt a complete oven meal consisting of roast, potatoes, vegetables, and pie will be wrapped in cellophane, then placed in a Hotpoint oven, the oven turned on, time clock set, and the meal left to cook.

Another Hotpoint demonstration will show one range cooking three complete meals simultaneously, in oven, cooker, and on top of the range.

## Domestic Appliances to Distribute Lipmans

MONTGOMERY, Ala. — Domestic Appliance Co., 222 Montgomery St. here, has been appointed distributor of Lipman commercial refrigeration and air-conditioning equipment in this territory.

**VIRGINIA SMELTING Company**  
WEST NORFOLK, VIRGINIA  
131 STATE ST. BOSTON - 78 BEAVER ST. N.Y.

EXTRA DRY  
**ESOTOO**  
LIQUID SULPHUR DIOXIDE  
**V-METH-L**  
VIRGINIA METHYL CHLORIDE

## Report Gives Data on Appliance Market in Argentina

WASHINGTON, D. C.—An interesting picture of the export market for electric refrigerators, air-conditioning equipment, and other electrical appliances in Argentina is given in the report recently made to the Bureau of Foreign & Domestic Commerce of the Department of Commerce by Commercial Attache A. V. Dye and Assistant Trade Commissioner C. H. Ducote.

Demand for electric appliances in the country is limited in range, says the report, due principally to modes of living which have little place for electrical devices, and to the high cost of current, especially in the territory outside of Buenos Aires. Standard education of the servant class is much lower than the American, and servants are not accustomed to, nor do they appreciate or understand, the use of electrical appliances.

The two companies which supply current in Buenos Aires have carried on extensive propaganda for the use of appliances, and their efforts are extending the field for these articles somewhat, but a condition such as outlined above makes introduction of many appliances a difficult process.

Basic cost of electric current in Buenos Aires is 25 centavos per kwh., equivalent to about 10 cents in American money, while special rates for larger consumers who use current for refrigerators, heating, and the like are as low as 3 cents per kwh.

Argentine manufacturing has been steadily expanded, the report says, and at the present time a wide range of locally made products are sold. As a rule, however, these are inferior to the American product, but in most cases the local product is highly protected by customs duties, and it is expected that in many lines Argentine-made or assembled articles will replace those made in other countries.

Most appliances are sold through large branch offices of American, British, Swedish, and German electrical firms. In addition, imported articles are distributed by small retail electric shops, and by department stores. The two electric companies demonstrate those appliances which are available from local stocks. The larger of the two companies also distributes at retail the goods which its displays and demonstrates; the other does not. A large portion of the imports, among smaller appliances, are still sold by agents, working on 10 per cent of the f.o.b. value as commission.

Imports of complete electric refrigerators, the report states, have practically ceased. The production of refrigerator cabinets in Argentina has reached the proportions of a domestic industry—refrigerator cases and cabinets of every description are now being made in Buenos Aires. Several of the well-known foreign makes, including American, have set up their own cabinet factories, to compete with domestic lines carrying Argentine trade marks.

Freezing units are the only imported manufactured parts now included in refrigerators sold in the country.

Largest domestic producer of refrigerators is the S. I. A. M. Di Tella Ltda. The American refrigerators are recognized as being of definitely higher quality, and only the price factor makes the locally produced product competitive.

About 40 per cent of the refrigerators sold are for commercial uses, 35 per cent are for household, and 25 per cent for new apartment houses. Most of them are of 4 or 6-cu. ft. size; chest models are not popular. The duty on complete refrigerator assem-

blies at present is 1.295 pesos, slightly over 37 cents in American money, per gross kilogram.

Air-conditioning units have been introduced some, but have not yet been popularized. Many theaters, restaurants, and a few new office buildings have been air conditioned.

Electric grills have not as yet been introduced. The reduction in the cost of current is dependent on installation of a special meter and wiring, and so there has been little incentive to install a device that plugs into any wall outlet. Besides, no standard load is allowed on these outlets. Duty on stoves and grills is 42 per cent of declared value; but the chief deterrent in their use is the high cost of electricity, as compared with gas.

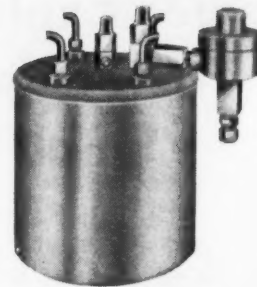
Although washing machines are subject to only 10 per cent duty, and while none are manufactured in the country, the market is relatively unimportant, the report states. Most of the washing is done by servants, and since servant labor is cheap, there is little inducement to invest in an expensive machine.

In general, appliances made in the United States are preferred to those made in other countries, but England, Sweden, Germany, and Italy also obtain a fair share of the trade in certain articles. Although German articles are generally priced lower than American ones, quality of these is not as well regarded, and they rank more with the locally produced product than with imports.

Imports from the United States, the report says, are not in a position to obtain "official" exchange (the rate granted to goods determined to be necessities, and not produced in Argentina) and must pay the full 20 per cent surcharge over that rate. Official exchange, however, is available for imports from England, Germany, and Sweden. Despite the inequality, preference for American-made appliances is sufficient to overcome this condition.

## Sell a Temprite first ... other sales follow

The Beer Dispenser needs a Temprite Cooler to serve beer as it should be served. When his Temprite is installed, his patronage begins to increase.



Then he needs more equipment which you can sell—keg storage refrigeration, back bar refrigeration, water cooling, food display, Chef's box, etc. Then air conditioning equipment may also follow.

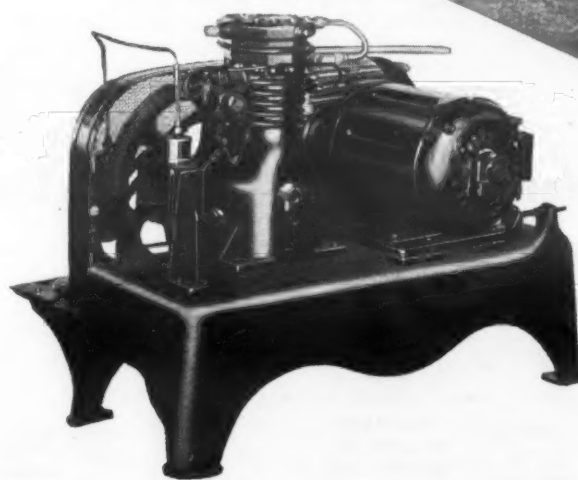
It is the Temprite that starts this chain because beer from a Temprite Cooler will always bring the customer back for more, and increase the Dispenser's business.



For the sake of your own business see that Dispensers in your territory have this chance to expand.

**TEMPRITE PRODUCTS CORPORATION**  
1349 EAST MILWAUKEE AVE. - DETROIT, MICHIGAN  
ORIGINATORS OF INSTANTANEOUS LIQUID COOLING DEVICES

## Modern Installations are usually served by UNIVERSAL COOLER CONDENSING UNITS



The manufacturer of the efficient modern ice cream freezer uses the Universal Cooler Condensing Unit because both he and his customer can depend on it for satisfactory, economical service.

**UNIVERSAL COOLER CORPORATION**  
DETROIT, MICHIGAN  
BRANTFORD, ONTARIO

MANUFACTURERS SINCE 1921 OF HOUSEHOLD AND COMMERCIAL REFRIGERATION EQUIPMENT



## Brewer Explains Problems and Factors in Lubrication of Small Compressors

THE development of the machinery essential to a new industry or to any branch of an already established industry has always presented a variety of unique problems. Where industrial production has been involved these have usually become a function of design, with the result that ways and means of handling the product and synchronizing operations have seemed to be most important to the designing engineer. ♦

Electric refrigeration, however, presented this additional problem. So in the development of the refrigerating system and the study of a wider variety of refrigerants than had been employed in the wholesale manufacture of ice, the designing engineer wisely took the chemist into his counsel.

Furthermore, certain of the refrigerants so adaptable to unit refrigeration work had been proved to be highly selective in their solvent effect upon certain types of petroleum hydrocarbons. So the study of lubrication of the electric refrigerator, and the selection of suitable lubricating oils became one of the outstanding problems of the industry and demanded the most exhaustive research.

As a result the petroleum industry, in turn, had to take a thorough interest in this new development.

"How it works" is often a point of interest to any owner of an electric refrigerator. Even the technician or practical engineer must sometimes stop to think out the refrigerating cycle. So a word as to what goes on when one plugs the connection into the electric socket will be in order.

Obviously, an electric motor is essential to run the unit, and electric current runs the motor to bring about rotary motion. Through a suitable connection to the compressor this rotary action is transformed into reciprocating motion in the cylinder type of unit or it rotates the rolling element in the rotary machine.

The compressor is one of the most important parts of a refrigerating

This process of refrigeration involves the transfer of heat from any given article or space which is to be cooled. In the conventional ice box, ice serves as the cooling medium. Being of much lower temperature than the contents or interior of the box, it tends to absorb heat from the latter.

As this occurs the temperature of the box is lowered, but at the same time the temperature at the surface of the ice is raised above the freezing point, hence melting takes place.

The extent to which a cake of ice can properly cool an ice box will of course depend upon the total area of its exposed surfaces. Where this area can be kept constant, uniform cooling will be accomplished. Otherwise, the temperature of the box will rise gradually due to outside influences, as the cake of ice becomes smaller.

The electric refrigerator replaces ice through the cooling effect of some liquid chemical of comparatively low boiling point. By proper circulation of this chemical through a suitable heat exchanger or cooling unit, a constant and uniform rate of heat transfer to this element from the space to be cooled is brought about.

In the circulation of any such chemical, there must be provision for handling, both in liquid and gaseous state. The actual work of refrigeration is done with the chemical in the liquid state by allowing it to evaporate, a phenomenon which is controlled by passing it through an expansion or regulating valve.

Evaporation, which is a result of boiling of the refrigerant, is effected by the drop in pressure which occurs as the refrigerant passes through the expansion valve.

Physics refers to the latent heat of the refrigerating medium in discussing refrigeration and heat transfer. In this connection it means the amount of heat necessary to change a product from liquid to gaseous state at its boiling point.

So, according to the rate at which liquid refrigerant is passed through the expansion valve, converted into gas and passed into the evaporator, heat is taken up and the temperature of the space surrounding the evaporator is lowered. This space is the interior of the refrigerator cabinet.

To complete the cycle this gaseous refrigerant must then be again converted to liquid form, a procedure which necessitates a compressor and condensing unit.

The equipment essential to a complete electric refrigeration installation therefore requires an electric motor, a compressor, condenser, the refrigerant receiver, an expansion valve (an oil trap or separator in

### Operation of the Compressor

From the viewpoint of lubrication, the compressor is the most important part of the system. For the information of the layman, this machine functions somewhat as a pump, being designed to compress the gas from a comparatively low pressure to a higher pressure.

The reciprocating type of compressor resembles in principle the automobile engine in design with the exception of the number of cylinders. Normally, the electric refrigeration compressor will have only one or two cylinders. In these cylinders are fitted the pistons with suitable connecting rods, wrist pins and crank connections.

The compressor crankshaft may be directly connected to the driving motor through a yoke connection or some other type of fixed coupling, or a belt connection may be used.

There is a marked difference in piston and cylinder design of the household type refrigerating compressor as compared with practically any other type of reciprocating machine, in that piston rings are rarely used. Instead, the designers plan for very close clearances between pistons and cylinder walls, and depend upon the lubricating film to maintain the necessary seal.

Another marked difference pertinent to this machine is the manner in which the gas to be compressed is drawn into the cylinders. In contrast with the conventional mode of handling the gas in any other type of compressor or engine, i.e., taking the charge from the topside as is customary in the automobile engine or air compressor, the electric refrigerating compressor has provision for drawing in the low pressure gaseous refrigerant through the crankcase, using valve mechanisms adjacent to or a part of the piston.

The rotary positive displacement type compressor brings about compression through the rotation of an eccentrically driven roller which moves in a gyratory manner in a closed cylinder. The inlet and discharge passages are separated by a suitable blade which is held in contact with the roller surface by springs or oil pressure.

Oil also serves to maintain the necessary seal between the surfaces of the roller and housing. Submersion of all the moving parts in oil under pressure therefore protects them adequately against wear and enables manufacture to very close clearances.

Irrespective of the type of compressor, the condenser performs the same function in a refrigerating system in that it brings the gaseous compressed refrigerant to a liquid state. This requires cooling of the condenser surfaces, which is accomplished by natural circulation of room air in the electric household unit, or by cooling water in some types of commercial installations.

The condenser is a form of heat exchanger just as is the evaporator. In the former, however, heat is taken away from the refrigerant, whereas in the evaporator this action is reversed; the refrigerant serving to take up heat.

After passage through the condenser, the refrigerant is therefore ready to do work and perform its intended function in absorbing heat from the air in the cabinet and from the water in the ice trays to make ice cubes.

Sulphur dioxide has long been one of the most popular refrigerants for small unit service, due to its ability to function at comparatively low pressures, its economy of manufacture, and

This diagram illustrates a mechanical device, possibly a pump or engine, with a complex internal structure. The device is shown in a cross-sectional view, revealing various components and their interactions. Key features include:

- Internal Components:** The device features a central cylindrical component, likely a piston or plunger, surrounded by various valves and connecting rods. The internal space is divided into several chambers, some of which are labeled with letters (A, B, C, D).
- Fluid Reservoir:** A large reservoir at the bottom is labeled "OIL". This reservoir is connected to the internal chambers via a network of pipes and valves.
- External Connections:** The device has several external connections, including a large circular port on the right side and a smaller port at the bottom. These connections are linked to a network of pipes and valves that extend outside the main housing.
- Labels and Markings:** The diagram includes several labels and markings:
  - A:** Points to a central cylindrical component.
  - B:** Points to a valve or piston mechanism.
  - C:** Points to the outer housing or casing.
  - D:** Points to a spring mechanism.
  - OIL:** Labels the fluid reservoir at the bottom.
- Flow Indicators:** Arrows indicate the direction of fluid flow within the device and through the external connections.

The overall design suggests a complex mechanical system, possibly used for pumping or controlling fluid flow in a specific application.

Fig. 3—Detailed view of the Monitor Top section of the General Electric refrigerating unit. Lubrication of this element is of distinct interest. Oil is carried in the base of the machine. Circulation of oil from points "A" and "B" is as follows: A small rotary oil pump located on the end of the shaft carries oil up through this hollow shaft and then through a by-pass to the compressor. Oil is also carried to the crank through a hole running from the main shaft to the side of the crankpin. When the oil leaves the compressor, parts of it is discharged vertically at a point marked "B" flowing upward and outward as indicated by arrows and following along the walls of the housing to return to the base. The remainder of the oil from the compressor flows out of another opening over the end of this part of the machine. This oil serves to cool the compressor and particularly the valves. The overflow spills into a cup which carries it to the motor compartment to flood and cool the windings. Small holes in the stator allow the oil to drain to the lower winding compartment, from which it spills through an overflow hole and returns to the sump as indicated at "D."

its low cost to builders of refrigerating machines. In liquid form, it is colorless, but in either liquid or gaseous state it has a strong pungent odor and is highly toxic.

On the other hand, this odor is regarded as an advantage inasmuch as leaks can be readily detected before concentration of the vapor in the air becomes dangerous.

In the handling of sulphur dioxide in refrigeration service, the utmost care must be observed in drying the unit and using a dehydrated lubricating oil, for this chemical is readily soluble in water, in which solution it becomes strongly acidic, and highly corrosive with respect to certain of the metals used in the system.

Sulphur dioxide, however, is not completely miscible with petroleum lubricating oils in the liquid phase at refrigerating temperatures, hence there is but little possibility of much change in the original viscosity of an oil other than the normal change due to temperature fluctuations.

In fact, sulphur dioxide is even claimed by some authorities to possess a certain amount of lubricating value itself, which is a distinct advantage in an entirely dehydrated system.

On the other hand, according to Philipp & Tiffany, in their paper entitled "Thermodynamics of Sulphur Dioxide Oil Systems,"

"The presence of lubricating oils in contact with liquid sulphur dioxide has been shown to change some of its physical properties, such as the evaporation temperatures, vapor pressure,

surface tension, etc. Both gaseous and liquid sulphur dioxide react with some lubricants with the formation of lubricant sludges or carbonaceous solids. The proper selection of a lubricant becomes, therefore, a very important consideration."

"When oil is exposed to sulphur dioxide vapor, some the vapor dissolves in the oil. The quantity dissolving depends on the temperature of the system and the pressure of the vapor. If the pressure is less than the saturation pressure for the vapor at the temperature of the system, only one liquid phase is obtained. The lower the temperature of the oil the more vapor it can dissolve at a given pressure."

There is an advantage to this solubility factor, however, in that it can be made use of to get oil which has been pumped into the condenser and receiver into the evaporator. The same authors state that:

"This is done primarily by dissolving the lubricant in the liquid refrigerant in the receiver. It is important, therefore, to have a lubricant which is quite soluble in liquid sulphur dioxide at room temperatures and as nearly insoluble as possible at low evaporator temperatures. If the solubility of the lubricant in the liquid refrigerant at receiver temperatures is low or if the compressor pumps a large quantity of lubricant, there will be an accumulation of lubricant in the liquid receiver whenever a low side float valve, expansion valve, or ther-

Diagram illustrating the components and layout of a mechanical refrigeration system, including:

- NEEDLE VALVE
- SCREEN
- BELLOWS
- OVERLOAD RELAY ELEMENT
- OFF & ON SWITCH
- CONTROL
- TEMPERATURE ACCELERATOR & DEFROSTING KNOB
- CONTROL BULB
- GAUGE PORT
- TO ELECTRICAL RECEPTACLE
- VALVE "D"
- ROLLATOR
- TORQUE REACTION MOTOR
- SCREENS
- VALVE "S"
- CHECK VALVE
- VALVE "K"
- LIQUID LINE
- SUCTION LINE
- EVAPORATOR
- CONDENSER
- APPROX LIQUID LEVEL
- SCREEN

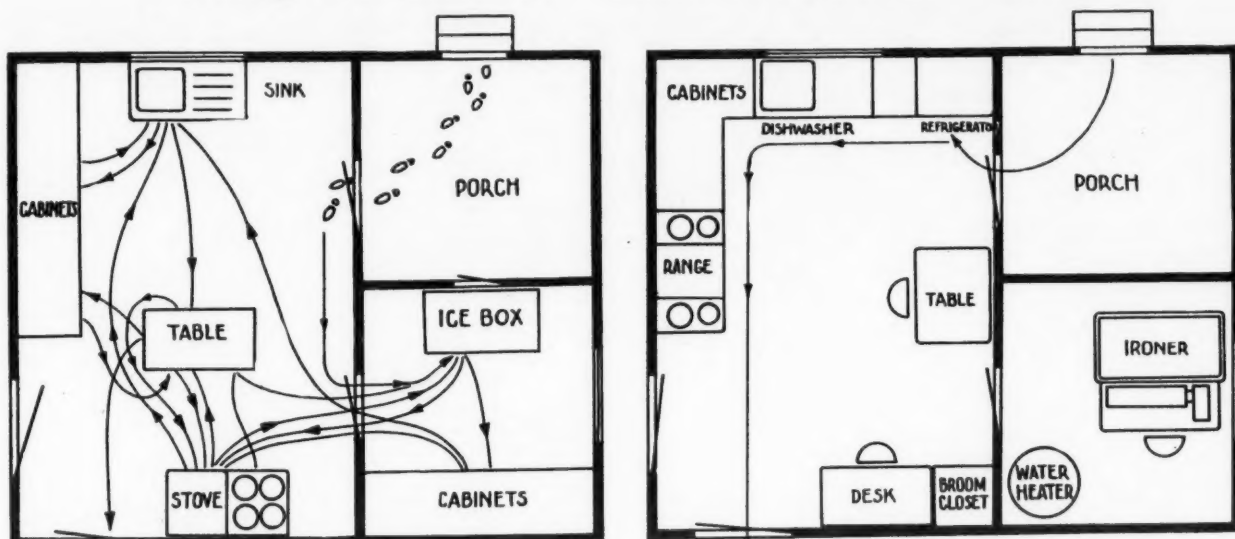
Fig. 1—Cycle diagram of the Norge refrigerating unit. Oil in the system follows the same path as the refrigerant, only more slowly. Arrows indicate direction of flow.

CYLINDER HEAD  
 VALVE SCREW  
 LIFTING WIRE  
 VALVE PLATE GASKET  
 PISTON VALVE PLATE  
 OIL GROOVE  
 ENLARGED VIEW OF PISTON VALVE AND DISCHARGE VALVE MECHANISM  
 VALVE REINFORCING PLATE  
 VALVE SPRING  
 DISCHARGE VALVE  
 DISCHARGE VALVE PLATE  
 PISTON VALVE DISC SPRING  
 PISTON VALVE DISC  
 PISTON  
 SHUT-OFF VALVE  
 HIGH SIDE OUTLET  
 SHUT-OFF VALVE GASKET  
 COPPER GASKET  
 OIL GRAUZE  
 OIL LEVEL  
 PISTON VALVE PLATE SCREW  
 THRUST PLUG  
 CONNECTING ROD  
 OIL RESERVOIR  
 THRUST PLUG  
 THRUST PLATE  
 COPPER GASKET  
 THRUST BALL  
 ECCENTRIC CLAMP  
 ADJUSTABLE CONNECTING ROD  
 OIL SLINGER  
 COMPRESSOR  
 BRAKE PLATE  
 OIL GRAUZE  
 PLYWOOD BOX  
 PLYWOOD DETENTING STOP SCREW  
 ECCENTRIC SHAFT  
 THRUST FOR WHEEL PALLET  
 OIL SEAL  
 OIL BALANCED SOLE  
 SOLE GASKET  
 ECCENTRIC STOP  
 COMPRESSOR  
 BRAKE GASKET  
 BALANCED PLYWOOD

Fig. 2—Constructional details of the Stewart-Warner compressor showing essentials of the lubricating system. Special oil slinger paddles attached to the eccentric splash oil onto the cylinder walls and into the reservoirs which lead to the bearings. Oil grooves cut in sides of pistons in turn assure of a source of lubricant for cylinder walls.



## Putting Kitchen on 'Line Production' Basis



The two charts above show the way in which the number of steps required in preparation of a meal are cut down through proper planning of kitchen layout.

## Clark Explains Need for Proper Planning In Designing Efficient Kitchens

By Irving W. Clark, Westinghouse Electric & Mfg. Co.\*

MANY examples are in evidence where the engineer and architect have joined hands in an effort to solve the housing problems which present-day living conditions have placed upon them. Older standards of construction, design, materials, equipment are facing the analytical mind of the engineer. That progress is being made is evident. However, further engineering studies in this important field are a necessity—we have just begun.

It is not within the scope of this discussion to advocate any particular architectural style, nor to more than outline the major engineering problems which the necessity for the building of several hundreds of thousands of family residences and the renovation of many hundreds of thousands of existing apartments have placed upon the shoulders of the engineering and architectural groups.

According to the more conservative estimates, based on data supplied by the various government bureaus and by independent building, statistical, and reporting agencies, 400,000 new residential units per year will be required for several years to come if we are to care for the present residential shortage, plus those required to care for the normal population increase, plus the replacement of those units that due to obsolescence have become entirely unfit for occupancy. This data further indicates that the average cost of these residential units will be \$5,000 or less.

During the past decade a great number of outstanding engineering developments of individual units and materials have been made available which have greatly relieved the drudgery against which housewives of earlier periods had to struggle continually.

The electric refrigerator, range, dishwasher, laundry equipment, cleaning equipment, improved lighting fixtures, better heating equipment, and, more recently, air conditioning either have been or are being developed to a degree of high individual efficiency. Continuation of the development to improve the efficiency of these units is most essential.

Development of these units and materials forms the basis of our major engineering problem in the residential field—the establishing of the proper relationship between these various units or materials which will change their status from one of an individual unit or material to that of an integral part of much larger units which will perform complete functions, in a more efficient manner.

For proper analysis of this problem we must divide it into two distinct parts:

1. That part which covers construction materials and the general structure of the house.

2. That part which concerns interior equipment and mechanics of operation of this equipment.

The second part of this problem we will further subdivide into three parts.

1. Operation, comprising kitchens, laundries, heater rooms, and baths.

2. Recreation, comprising the living rooms, dining rooms, and game rooms.

3. Retirement, comprising all sleeping quarters.

Without in any way minimizing or detracting from the importance of the recreation and the retirement parts of our house, the main engineering problems are concerned with the operation division. The development of the latter two divisions has been much more rapid, due chiefly to the fact that the problems of these two divisions are more closely related to the artistic sense, which has received a greater amount of attention from architects and designers than has

the operative side of the residence.

There is one room in the operation part of our residence which has lagged far behind the other rooms—the kitchen. Ninety to 95 per cent of the kitchens existing today are obsolete either from the standpoint of equipment or from the standpoint of arrangement. Some four years ago the necessity for concrete studies and research in this field became most evident to the electric manufacturing world. The planning of this important room is filled with engineering potentiality.

The same principles which have been the engineers' guide in planning efficient manufacturing plants are used in developing a kitchen plan. The kitchen is, in reality, the manufacturing part of a house.

The two charts (Fig. 1) indicate the contrast between the average kitchen which, like Topsy, "just grewed," and the planned kitchen. The one at the left represents the average kitchen, in which the routes of travel to prepare an average meal are represented. The lines running in and out, up and down, and in many crossing directions indicate the direction of travel and the number of steps which are required to prepare an average meal in a kitchen of this type, which is representative of 90 to 95 per cent of our residential kitchens today.

Contrasted with this is the other chart, indicating what careful planning and proper relationship accomplishes. Note the single straight line of operation from the receipt of supplies at the rear entrance to the delivery of the finished food products at the dining room door.

In our studies we have found in many kitchens which required from 200 to 320 steps to prepare an average meal, that by the proper planning and arranging of the work centers, the same meal can be prepared in from 50 to 60 steps. This is a decided accomplishment.

Fundamentally, good kitchen planning is comparatively simple. Authorities agree that there are three centers of operation to this important room. These centers are:

1. The refrigeration and preparation center.
2. The sink and dishwasher center.
3. The range and serving center.

Each of these centers can stand as a complete unit, although, as we shall indicate, the relationship between the various centers has a very definite bearing on the efficiency of any particular kitchen.

The refrigeration and preparation center combines the storage of all perishable goods in the refrigerator, and the storage of staple food materials in the cabinets above the counter. The counter surface makes a convenient, properly located work surface, upon which to blend these foods, while in the base cabinets beneath the counter surfaces are stored mixing cutlery, flour, sugar, and baking utensils.

This is quite a contrast to conditions found in the average kitchen where the refrigerator in far too many cases has simply replaced the old ice-box down the back hall, on the back porch, or in a poorly selected, inconvenient corner of the kitchen itself.

The sink and dishwashing center is the key to kitchen arrangement around which the other centers should focus. It is, therefore, given the No. 2 position which places it between the refrigerator and preparation center and the range and serving center.

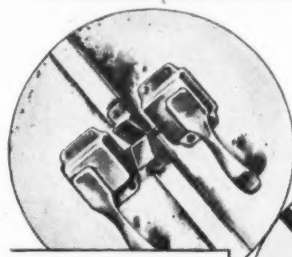
Here all cleaning operations are performed. Cabinets on either side above the counter surfaces are used for the storage of dishes and glassware. This location is quite a contrast to carrying them back and forth to pantries.

As in the other two centers the range and serving center's ample

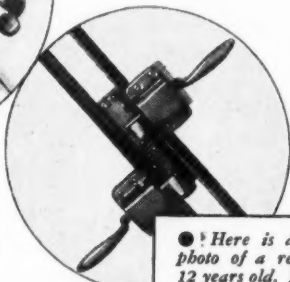
counter surface for the proper placing of serving dishes during the important period of serving a meal has greatly increased kitchen efficiency. The cabinet directly above the range cares for the storage of vegetable serving dishes and platters.

Again, this is a contrast to the methods used in the hodge-podge kitchen of yesterday, when these pieces of serving equipment were stored in the most inaccessible and out of the way places.

In the cabinet below the counter on the side of the range is stored the necessary cooking cutlery, pastry which is needed in serving, and frying pans. This center, like the others, can stand as a single unit by itself but its efficiency is greatly increased by the proper relationship to the others.



Here is what ordinary household use (after only a few years) does to organic soft finishes which are subject to "ice-box eczema".



Here is an unretouched photo of a refrigerator over 12 years old. Note the perfect condition of the inorganic porcelain enamel finish.

I can't see  
any substitute  
FOR  
Quality!



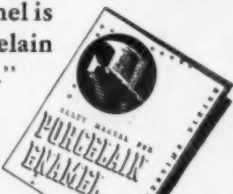
I'm an electric appliance dealer—in business to stay. I meet my customers face to face. I know them by name. I'm friends with them. So when I say they ought to buy this or that, I'm responsible. Because if I tell them wrong I lose their respect, their friendship and their trade.

I have always told them right. If a new thing comes along that is better, I tell them about it, even if I have to hold the bag on some old line. But you can bet your last nickel I thoroughly test every new thing that does come along. Everything about my

merchandise has to be right. I can't see any substitute for quality.

That is why I almost insist my customers buy appliances finished with porcelain enamel. I know that porcelain enamel is flint hard; that it never gets "ice-box eczema" like all other softer finishes. That's why I tell my customers "porcelain enamel is the lifetime finish"—that "porcelain enamel gives lifetime satisfaction."

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MILLIONS WILL SOON BE  
TALKING ABOUT  
**SAV-A-STEP**



Biggest Refrigeration Sales  
Feature for 1936

WATCH FOR EARLY ANNOUNCEMENT

**STEWART-WARNER**



\*Presented before Cleveland Section, A.I.E.E.



## Westinghouse Hermetic System

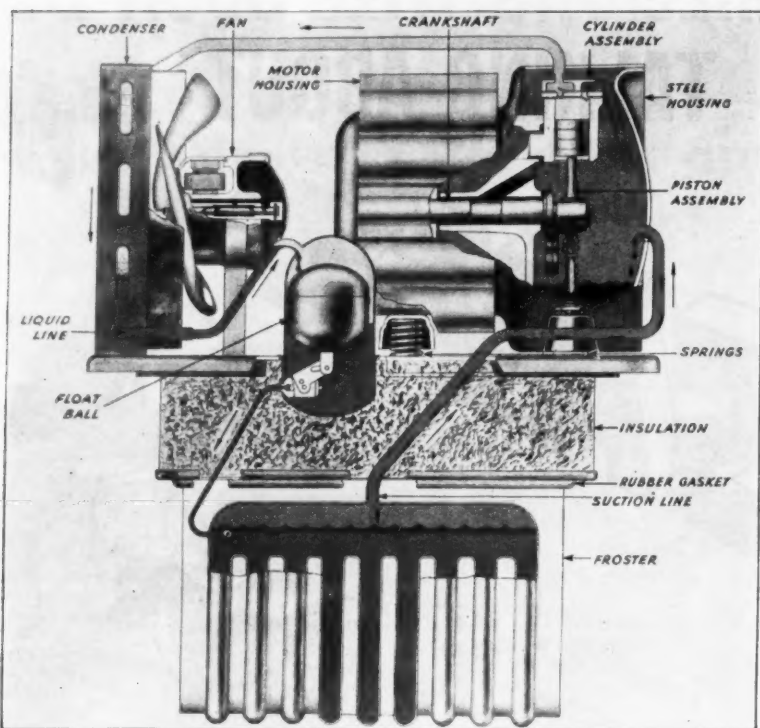


Fig. 4—Cycle of operation of the Westinghouse stream-line refrigerator. The oil in this system is shown in heavy black. Note path followed by oil along with low pressure refrigerant vapor from the froster to the base of the compressor. Note also the fan motor which is lubricated from a permanent oil supply carried in the motor housing.

## Factors & Problems In Lubrication of Small Compressors

(Continued from Page 12, Column 5)

mostatic expansion valve is used. Obviously it becomes desirable, therefore, to obtain a lubricant with a high temperature coefficient of solubility in liquid sulphur dioxide.

It has also been determined that: "... it is possible to utilize a lubricant which is quite insoluble in liquid sulphur dioxide at all temperatures, providing a fixed restriction or high side float feeding device is utilized for metering the liquid refrigerant to the evaporator. Whenever a low side float, expansion valve or thermostatic expansion valve is employed, an oil which is soluble in liquid sulphur dioxide at room temperature and quite insoluble at the evaporator temperature is desirable.

### Effect of Impurities

"Water produces the most harmful reactions in a sulphur dioxide refrigerating system. The quantity of water in the system and the type of system determine in general the extent of the corroding effect in the system. The sulphur dioxide which is commonly used today in refrigerating systems has water contents on the average of about 0.001 per cent by weight. The refrigerating system is usually baked at a temperature of 250° F. to 275° F. for a period of four hours under a vacuum of less than 1/4 in. mercury absolute pressure.

"We are quite safe in saying that with these precautions for moisture removal the absolute moisture content in the completed system is extremely low. The quantity of moisture

and the place of introduction of this moisture into the system will determine the extent of damage. If the moisture is introduced into the compressor or remains in the compressor so that it emulsifies with the lubricating oil and sets up a local high concentration, the reaction between the sulphur dioxide and the ferrous metals becomes quite rapid and severe. The temperature in the compressor, the emulsifying effect of the lubricant and the possibility of reaching a high localized concentration of water, all are suitable for accelerating the corroding reaction of the sulphur dioxide with the ferrous metals."

### Fluorinated Refrigerants

The halide derivatives of the aliphatic hydrocarbons contain one or more fluorine atoms. Dichlorodifluoromethane, commercially known as Freon, is the best known of these products. They are advantageous for refrigerating system due to their extremely low toxicity, being even less toxic than carbon dioxide.

Freon is practically non-soluble in water and does not alter the taste of drinking water; furthermore, it has no effect on furs and most foodstuffs. Its mixtures with air are practically odorless and if a system installed in a theater or other public place should leak, there would be no panic of the audience as they would not even know that they were being exposed to its vapor. They also could not be injured because concentrations as great as 20 per cent may be inhaled for a long period of time without causing any organic disturbance.

These products are also non-corrosive to the metals which are used in refrigeration equipment and are non-flammable and non-explosive. Leaks of these refrigerants are easily detected by means of a halide lamp and the Underwriters' Laboratories

say concerning dichlorodifluoromethane "The hazards to health resulting from exposure to dichlorodifluoromethane when used as a refrigerant are judged to be remote. Consideration of available data indicates that dichlorodifluoromethane is in a class with the practically non-toxic gases."

### Hydrocarbon Compounds

The aliphatic hydrocarbons, such as ethane, propane, butane, and isobutane, have also been used as refrigerants. At the present time they are not being considered for use in refrigerating equipment due to their inflammability and explosive nature. In consequence, they should not be used where leakage would mean exposure to open flame.

### Oxidation and Breakdown

The possibility of oxidation being induced by leakage of air into a Freon-charged compressor is virtually eliminated, inasmuch as chemicals of this nature, functioning at a low positive back pressure, prevent entry of air instead of tending to leak out themselves.

Authorities believe that outward leaks are better than inward leaks of air, assuming, of course, that the refrigerant is non-toxic, non-irritating, non-inflammable, non-explosive, and not injurious to food, and therefore not capable of causing panic or fire hazard. It is also felt that this insurance against inward leakage of air will reduce the possibility of sludging or oxidation of compressor oils.

### Lubrication

In regard to lubrication, the remarks of R. J. Thompson of the Kinetic Chemicals, Inc., in Technical Paper No. 11 are distinctly interesting.

"The lubrication of a Freon charged compressor is similar to that of a compressor using a refrigerant that is completely miscible with mineral lubricating oil, such as methyl chloride. Since Freon and mineral oil are completely miscible, an oil of higher viscosity is required than when using a refrigerant that is not miscible with the lubricating oil."

"The proper selection of a lubricating oil can only be made after having obtained a clear understanding of the physical conditions under which the compressor and system is to be operated. Factors which must be taken into account are, bearing loads, rubbing speeds, clearance, type compressor (enclosed or open frame), type compressor (air- or water-cooled), temperature of evaporator, type evaporator (flooded or dry expansion), etc.

"With this group of factors, which are quite variable, an almost endless number of combinations can be produced which will require lubricating oils of various characteristics.

"It must be recognized that a small capacity, low horsepower, slow speed, enclosed type, air-cooled compressor, operating a flooded evaporator at temperatures well below the freezing point of water, will function efficiently with a very light, low viscosity and low pour point oil.

"While in contrast, a large capacity, high horsepower, high speed, water-cooled compressor using trunk type pistons or an open frame, operating a flooded evaporator well above the freezing point will require a higher viscosity and higher pour point oil. Between these two extremes there will exist various combinations of conditions with the result that it is not possible or wise to recommend an oil of any particular viscosity, flash point, fire point, pour point, etc., to meet all of the various operating conditions.

"For small domestic refrigerating systems of the enclosed type, an oil of 150 (for flooded systems) to 300 (for expansion systems) viscosity, flash point 350 to 425° F., fire point 390 to 475° F., and a pour point of -10 to -30° F., may be used with complete satisfaction considering the operating conditions.

"The lubricating oil for use with Freon charged compressors should be a straight run and properly refined mineral oil and obviously must not contain water, sediment, acid, soap, resin, or any substance not derived from petroleum and must not form wax or gum in the presence of Freon. Also, the oil must not corrode any metal used in refrigeration construction.

"Mineral lubricating oils must be thoroughly dehydrated, not because of any chemical reaction but for the reason that any moisture in the oil will freeze out and thus restrict the flow of refrigerant through the regulating valve.

"The question may arise as to the manner in which the oil contained in the flooded evaporator will return to the compressor crankcase, and in the following will be given an explanation of this question. As the evaporator absorbs heat, and the gas bubbles rise to the surface of the Freon-oil solution, the oil film of the bubble is ruptured and these finely divided oil particles form a mist in the Freon vapor and are swept along by the gas stream formed by the ebullition of the refrigerant.

"These oil particles or oil fog will blanket the Freon-oil solution to a height or thickness in the evaporator which may be predetermined by experiment and will be dependent upon

## Cycle of Copeland Domestic Unit

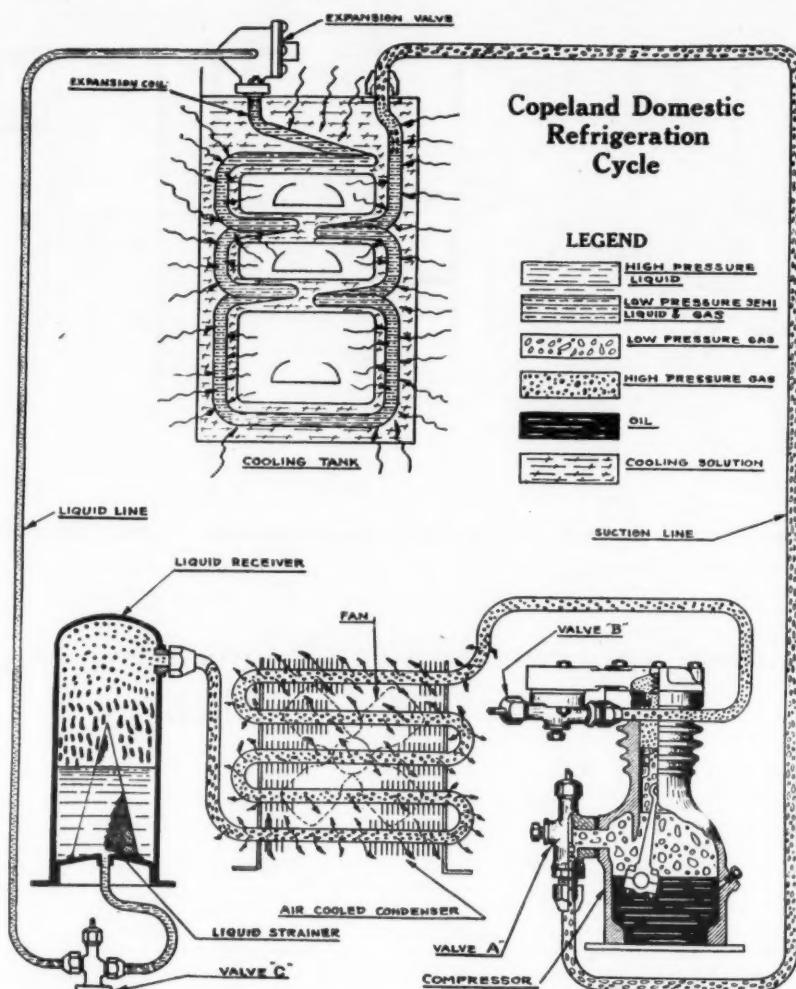


Fig. 5—The Copeland domestic refrigeration cycle. Note legend which indicates high and low pressure gas, the lubricating oil, etc. The compressor in this installation is lubricated by oil splash.

evaporator temperature, capacity, design, location of oil vapor return tube in relation to Freon-oil solution, and also the characteristics of the oil itself.

"The Freon vapor which is being returned to the compressor will carry this oil fog through the suction line and return the lubricating oil to the compressor crankcase (closed type), cylinders (trunk or open frame type compressor) or oil interceptor, as drops of oil.

"Oil logging of the flooded evaporator will occur, should the suction or oil fog return tube be placed too high above the surface of the boiling liquid refrigerant, which will permit the oil fog to settle back into the Freon-oil solution.

"Frosting or sweating of the return line will occur, should the suction tube be placed too close to the surface of the boiling refrigerant where particles of liquid Freon may be splashed or drawn into and vaporized in the return line to the compressor. There will be no oil logging of evaporators of an expansion system due to the high velocity of refrigerant vapor or gas in the return line pushing along any oil particles.

"Freon absorbs small quantities of mineral oil, depending on the oil characteristics (pour point and viscosity), the temperature of the oil in the crankcase, and the operating back pressure in the compressor crankcase; but unlike other refrigerants (other than hydrocarbon refrigerants) it does not deposit the lubricating oil in the low side of the system and cause oil logging. More Freon will be absorbed by the oil at higher pressures and at lower temperatures, or vice versa.

"During the off-cycle of the compressor, the oil temperature in the crankcase is lowered and the back pressure is increased which will permit the Freon vapors to become absorbed by and condensed in the

mineral oil. At the time the compressor starts operation, the back pressure in the low side crankcase is suddenly reduced with the result that the Freon in solution with the crankcase oil will boil out causing the lubricating oil to foam.

"Should the system be overcharged with oil, this foaming oil will be scrubbed through the intake and discharge valves and the excess amount of oil in the crankcase will soon pass into the receiver and into the low side of the system. When the compressor is charged with the proper amount of oil, there will not be excessive splashing of oil by the eccentrics or crankshaft and the foaming of the oil will not cause faulty operation of the compressor or evaporator.

"Small tonnage compressors using the splash system of lubrication which returns the refrigerant vapors and oil directly to the compressor crankcase, may have oil level regulating devices or controls. Small capacity units designed for household installation should not be overcharged with oil, and since this oil charge may be very easily controlled, there is no occasion for using oil-level regulating devices."

### Methyl Chloride

This chemical as manufactured for refrigeration purposes from methyl alcohol and hydrochloric acid is a gas under atmospheric conditions although it is marketed as a liquid under considerable pressure.

It is colorless under both conditions, neutral to litmus, contains practically no water and has but a slight odor akin to ether. Research as to its stability has indicated that in the absence of moisture, it is non-corrosive to metals and non-injurious to lubricating oils, although it does mix with the latter to bring about some reduction in viscosity.

(Concluded on Page 15, Column 1)

## Details of Serval Machine

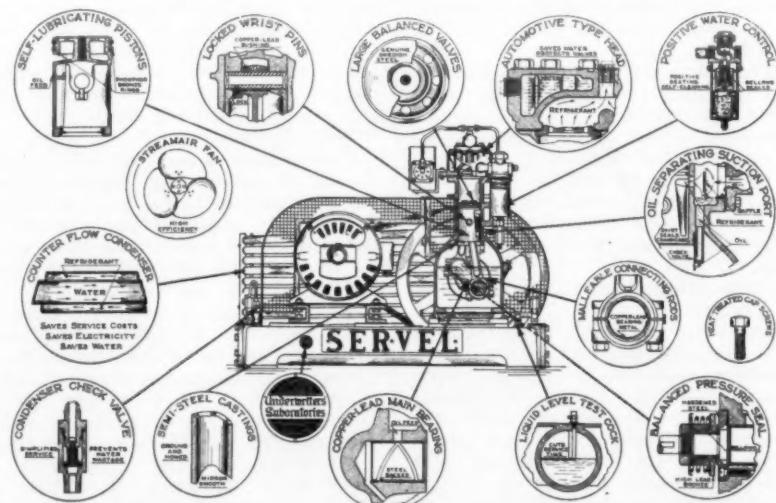


Fig. 6—The Serval electric refrigeration condensing unit with essential parts shown in detail. Inasmuch as all refrigerating machines using methyl chloride, Freon, or other similar refrigerants circulate some oil with the refrigerant, provision is made for returning this to the crankcase through special check valves connected to the suction port.

## IT PAYS TO SAY "SYLPHON"

A Sylphon Bellows is not just another metal diaphragm. Originated and pioneered by this company 35 years ago, this little seamless, jointless "miracle in metal" has been the subject of more research and development than has any other product of its kind in existence.

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## Williams Uses 'Dry' Crankcase

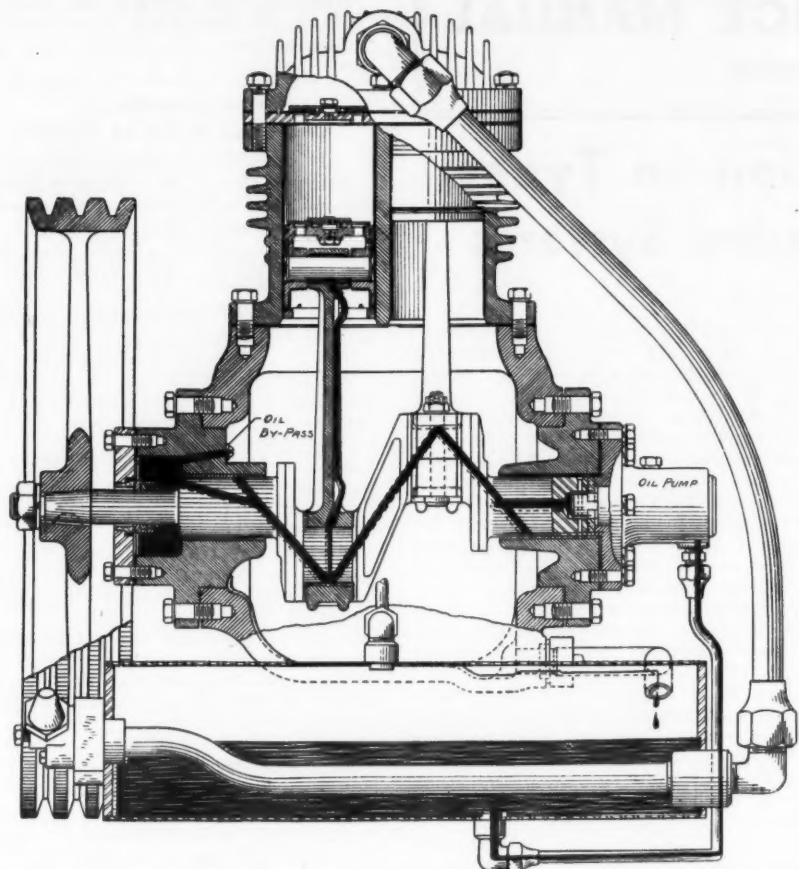


Fig. 7—The compressor body of a Williams Ice-O-Matic refrigerating unit, showing the pressure lubrication system. The oil pump is of the rotary gear type and is driven from the crankshaft. Note that the oil supply is removed from the crankcase to an auxiliary oil tank, thereby giving a "dry" crankcase. Oil in the system is indicated by heavy black.

## Lubrication Systems For Small Units

(Concluded from Page 14, Column 5)

Relative to lubrication and the properties essential in a lubricant for use with methyl chloride, the R. & H. Chemicals department sales division of E. I. du Pont de Nemours & Co., Inc., states:

"In types of equipment containing large charges of methyl chloride, where leakage of the refrigerant may result in exposure of persons to higher concentrations of the gas and thus present a hazard, it is customary to use methyl chloride containing a warning agent, for example, 1 per cent of Acrolein which acts as an eye, nose, and throat irritant.

"Irritants are not present in the majority of methyl chloride installations as these consist of small unit systems where leakage of the entire refrigerant charge would result in only low and relatively harmless concentrations of the gas.

"Most of the special problems presented by the higher pressure refrigerants of the hydrocarbon and halo-hydrocarbon groups, such as the problems of oil foaming and oil return in methyl chloride and Freon machines are identical, although less methyl chloride dissolves in the lubricating oil due both to the lower absolute

case of equipment doing heavy duty, such as low temperature ice cream jobs. Although an exact analysis of the causes of this trouble has not been made, it has been satisfactorily eliminated by resorting to the use of oils low in sulphur content, free from saponifiable matter, free from acidic materials, and showing a high resistance to oxidation; and, in addition, keeping the refrigeration system free from moisture."

### Ethyl Chloride

Ethyl chloride has at various times been considered also for electric refrigeration purposes. It has never become a serious competitor of any of the other refrigerants, however, due to its comparatively high boiling point. Physically, it is much similar to methyl chloride as to toxicity, stability, and flammability. Like methyl chloride, it also has no deleterious effect upon petroleum lubricating oils other than to cause a certain reduction in viscosity. It is manufactured from ethyl alcohol and hydrochloric acid.

### Carrene

This is another of the chlorinated hydrocarbon refrigerants which has come into considerable favor for use especially in the centrifugal or rotary type of compressor. Carrene, known to the chemist as dichloromethane, has lent itself admirably to this type of design especially where operation is carried out under a vacuum on both the "high" and "low" sides and where there is but little likelihood of the refrigerant leaking into the atmosphere and creating a hazard.

Like other chlorinated hydrocarbons such as methyl chloride, Carrene is also virtually inert to the metals used in refrigeration equipment; on the other hand it mixes readily with petroleum lubricating oils to reduce their viscosity. In consequence, this tendency must be borne in mind when deciding on the original viscosity of any oil for service with this chemical.

### Systems of Lubrication

There has been a lot of consideration given to methods of lubrication in the development of the unit refrigerating compressor. With automotive experience as a background and the comparatively successful results obtainable from splash lubrication, as it was used when the electric refrigeration industry first came into prominence, it was logical that this means of lubrication should be favored. It has proved its dependability and economy and still is preferred by many builders.

More recently, however, there has been extensive research into the adaptability of pressure, either alone or together with splash, the purpose being to obtain positive circulation of oil throughout the compressor and to eliminate foaming as far as possible.

Obviously, in a splash-lubricated reciprocating compressor, foaming will always be present. The extent to which it may be objectionable will depend upon the oil level and the location of the suction valves. Inasmuch as the unit type of compressor takes its suction through the crankcase, if the foam level rises to a sufficient degree foam may be carried

over to the high side with the refrigerant to cause serious retardation of heat transfer. Ultimately, if allowed to continue, cleaning of the system may be necessary.

The automotive type of gear pump for oil distribution proved equally adaptable to the refrigerating compressor. The typical gear pump as designed for positive delivery of oil is a comparatively simple device consisting of a pair of gears mounted in a suitable house.

The normal location of such a pump is in the base of the crankcase of the compressor. Some authorities prefer to place this pump at the lowest part of the case.

Others are of the opinion that the pump should be set just above a depression or catch basin in the case to provide means for trapping foreign matter and preventing it being circulated through the lubricating system.

Irrespective of the location of the pump, however, suction is automatically maintained by gravity since the pump is below the normal oil level. The discharged oil, under pressure, according to the speed of rotation of the gears and their relative tooth dimensions, is led from the discharge side of the pump to the connecting rod bearings and other elements by drilled passages and suitable piping connections.

As oil passes out from the bearing clearance spaces, or drips from the cylinder walls or other parts of the interior housing, it returns to the case or oil sump by gravity for recirculation.

### The Rotary Pump

The principles of rotary motion are involved in the floating blade type of rotary oil pump. Two blades free to move in a slotted rotor serve as the pumping media. In the General Electric design, this rotor is fixed to the lower end of the vertical motor shaft. The oil is carried in the base of the unit, being drawn up and pumped through a passage drilled in the motor shaft, and thence through other passages to the yoke arrangement and lower shaft bearings.

The majority of the oil, however, goes to the self-aligning top bearing and to the cylinder wall. On leaving these elements, part of this oil returns to the base, the remainder flowing through the stator of the motor to cool the windings.

### Oscillating Cylinder Reciprocating Design

Most recent studies in connection with commercial refrigerating units have been directed towards the adaptability of the oscillating cylinder type of reciprocating pump. This is of single cylinder design, operated from an eccentric on the end of the crankshaft. The entire assembly is located so as to be readily accessible for inspection without removal of other parts.

This pump is designed to supply oil under pressure directly to the two main bearings. From here, oil is

passed through holes in the crankshaft to the connecting rod bearings, centers bearing, and shaft seal. Through tubes, a part of this oil is also pumped to the piston pin bearings. The cylinder walls, however, in any machine equipped with this type of pump are splash lubricated.

### Lubrication Practice

The owner of the electric refrigerating compressor is normally relieved of the responsibility of lubrication; instead, this is taken over by the builders. In other words, all machines as they leave the manufacturer's plant are lubricated with an adequate charge of oil, which, barring unforeseen development, is capable of maintaining lubrication for a period of

described. Another factor which imposes a comparatively severe requirement upon any oil used for electric refrigeration service is that, in addition to lubricating the compressor and motor bearings, it must also serve as a cooling medium for the stator windings in some types of machines.

### Handling of Lubricants

The methods employed in handling lubricating oils for condensing units should always be given careful consideration. It is essential at all times that every precaution be taken to keep the oil virtually free from water, and the system free from air. . . .

In the original assembly, drying and lubricating procedure at the manufacturer's plant, the utmost care is observed in this regard.

In servicing, especially where re-lubrication is necessary, it is not always practicable to furnish the service engineer with plant facilities. Hence the practice among many builders of bringing units into a headquarters' service plant or even to their main plant for overhaul.

Where field service must be carried out, lubricating oil should preferably be handled in one to five gallon sealed cans, obtained directly from the refinery.

This will assure of the necessary dielectric strength which is an indication of freedom from water; it will also assure that the oil has not been exposed to sunlight, air, or foreign non-lubricating impurities, as might occur so readily if repackaging from bulk is practiced by the machine manufacturer.

Purchasing of oil in small capacity, sealed containers is, of course, more costly but when balanced against the cost of rehandling of bulk oils by a machine manufacturer, the ultimate costs should show but very little difference.

### G-E Oil Pump



Fig. 9—The oil pump for the General Electric type CM condensing unit. This device is an oscillating cylinder type of reciprocating pump operating from an eccentric on the end of the crankshaft.

several years or longer, according to the operating conditions.

When re-lubrication is necessary, it is customary for this to become a part of the service procedure. Uniformity in lubrication is thereby assured and the possibility of use of an unsuitable oil by any machine owner is entirely eliminated.

It has been essential for the builders to follow such a procedure due to the properties of the various chemicals used for refrigeration, as already



### Norge 'Rollator'

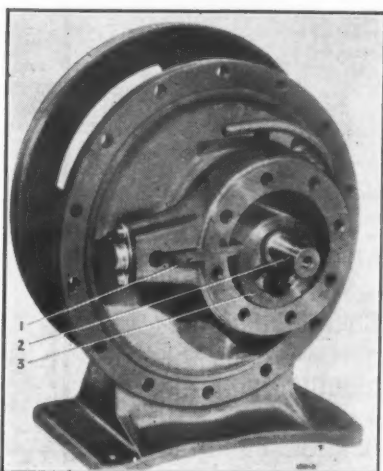


Fig. 8—The Norge "Rollator" principle. Note the three moving parts, i.e., blade, roller, and cylinder. These parts operate continually in a bath of oil.

solubility of the methyl chloride in the oil and to the lower operating pressures of the methyl chloride machines.

"The tendency for methyl chloride to dilute the lubricant points toward the use of higher viscosity oils. This same solubility factor makes it generally unnecessary to use very low pour test oils as solution of methyl chloride in an oil lowers the pour point."

"In the early development of methyl chloride equipment, the deposition of copper on steel bearing surfaces was sometimes noted—especially in the

## Motors for Air-Conditioning Systems

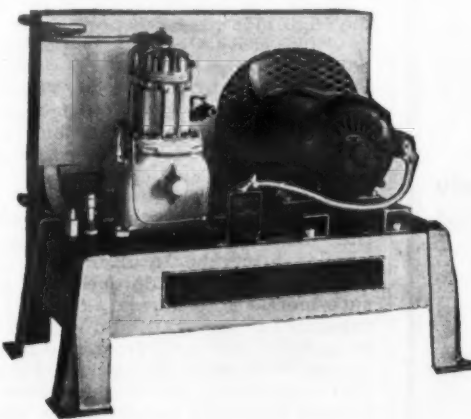
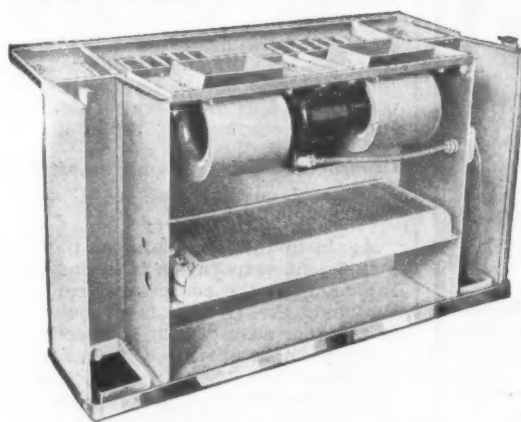
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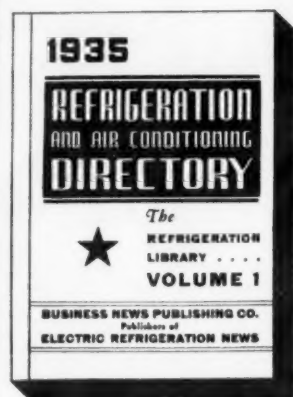
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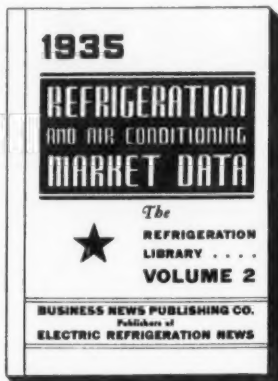


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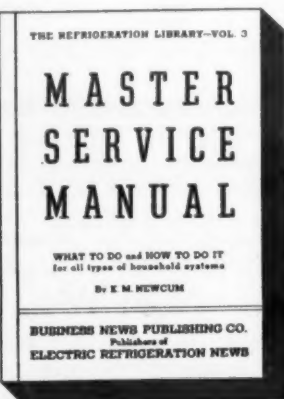
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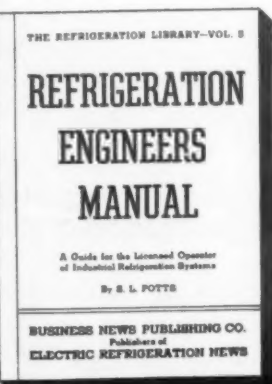
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## MASTER SERVICE MANUAL

### Chapter 9—Service

## Service Information on Types '1D' & '2A' Flooded Systems

By K. M. Newcom

### Service Complaints on Type '1D' Flooded Systems

All service complaints on type "1D" systems are the same as on type "1C."

### Service Operations on Type '1D' Flooded Systems

The type "1D" system is the same as "1C" except that the evaporator is not equipped with service shut-off valves Nos. 4 and 5.

Service operations are the same as on type "1B" except where reference is made to the low pressure control where it is to be assumed that the thermostatic control is to be dealt with.

It is also necessary to omit service operations dealing with adjusting and changing the low pressure control, and to substitute instruction given in Chapter 6 on the care and adjustment of thermostatic controls.

### Type '2A' Flooded Systems

Type "2A" flooded systems employ the high side float valve contained in the liquid receiver, the liquid temperature valve on or near the evaporator, and a thermostatic control.

The service valve arrangement is shown in Fig. 145. In addition to valves 1, 2, and 3, the valve located on top of the receiver is included and labeled purging service valve No. 9.

Service complaints and operations are given with the combination gauge set installed and properly connected to valves Nos. 1 and 2, as shown in Fig. 145.

The cycle of operation and the general function of the high side float system is given in Chapter 5, paragraph 65.

It would be well to review this paragraph before proceeding with the following service complaints and operations.

### Service Complaints on Type '2A' Flooded Systems

#### Service Complaint No. 1: Compressor Does Not Run Much; Evaporator Is Defrosting

The fact that the evaporator is defrosting would suggest that insufficient evaporation is taking place. That the compressor does not run much would indicate that the thermostat is not keeping the compressor in operation sufficiently long to provide sufficient evaporation to reduce evaporator to the proper temperature.

The thermostat should be carefully checked for all possible causes of too warm a setting or a discharged power element.

The overload relay should be examined. Conditions causing the overload relay to snap off should be corrected.

If unable to obtain the correct temperature adjustment, the thermostat should be repaired, or replaced.

#### Complaint No. 2: Compressor Runs Continuously, But Ice Does Not Freeze

Again in this complaint as in No. 1, insufficient evaporation is taking place. Inasmuch as the compressor runs continuously the trouble is probably not in the thermostat, as it is keeping the compressor in operation in an attempt to reduce the evaporator temperature. The operating pressures should be checked.

If the low side pressure is low and the high side pressure normal or low, it would prove that the evaporator is not being supplied with a sufficient amount of liquid refrigerant. This may be due to a shortage of refrigerant in the system, maintaining a low liquid level in the float chamber, keeping the float down and closed.

Additional refrigerant should be added through the low side, checking the normal operating pressures at regular intervals. If after adding refrigerant, the low side operating pressure increases to normal and the head pressure is normal, and the entire evaporator starts to frost, the system should be allowed to operate for several minutes. After several minutes of normal operation the frost line should be checked as described on page 83 of the INTRODUCTION.

If the back pressure is low and the head pressure high, the system may have air both in the top of the condenser and in the top of the evaporator. If after a large quantity of refrigerant has been removed from the system the

denser and the liquid receiver. Air in the system will reduce the efficiency of the compressor to a point where long or continuous operation may result, with poor refrigeration. If, after purging the condenser, the head pressure returns to normal, and the back pressure remains low, the receiver should be purged, and any increase in the back pressure noted. Air in the receiver may tend to hold the float valve down. Purging the receiver should relieve this condition.

A leaky discharge valve or a leaky suction valve would render the compressor inefficient and might be the cause of this complaint.

Any restriction in the float valve would also cause this complaint. If adding refrigerant and purging does not release the float valve, so that it supplies sufficient liquid to the evaporator, it should be changed or cleaned.

A stuck shut liquid temperature valve would also retard the inflow of liquid to the evaporator. A slight jar with a screw driver handle will usually break the valve loose. When loosened, the low side pressure should rise to normal as normal circulation is resumed.

An excessive overcharge of refrigerant would cause the back pressure to remain very high, which would retard evaporation and result in a high evaporator temperature. This condition may be determined by stopping the compressor and listening for a rushing noise at the liquid temperature valve, and noting the back pressure and head pressure.

If the back pressure increases rapidly to equalize with the head pressure, and liquid may be heard flowing through the liquid temperature valve on the off cycle, it is apparent that the float is open.

A leaky float will also cause this condition. To determine which of the float does not seat, causing the pressures to return to normal, the float valve must be leaking and should be replaced.

#### Complaint No. 3: Trays or Metal Parts of Refrigerator Tarnished

This complaint would be the same on any type of system and is covered in complaint No. 3 under type "1A" system.

#### Complaint No. 4:

##### Costs too Much to Operate

This complaint may be due to the thermostat being set too cold, resulting in a refrigerator temperature lower than necessary.

The user may also have been misinformed as to the actual cost of operation.

All causes of increased running time should be checked. The causes are given in detail in complaint No. 2.

A shortage of oil in the crankcase may cause the compressor to run stiff, thereby increasing the current consumption.

A worn or tight motor may also increase the current consumption. A belt that is too tight will cause an overload on the motor.

High head pressure from air in the system, or from restricted circulation to the condenser, is a very common cause of high electric bills.

A poorly insulated cabinet or a leaky door gasket will increase the refrigeration demand on the system and cause longer than normal running time.

#### Complaint No. 5:

##### Compressor Noisy

This complaint would be the same on any type of system and is covered in complaint No. 5 under type "1A" system.

#### Complaint No. 6:

##### Ice Freezes But Food Spoils

This complaint would indicate that the system is functioning properly as the ice cubes freeze.

The fact that the food spoils must be due to lack of refrigeration at various points in the refrigerator. A very common cause of this complaint is a heavily frosted evaporator. The evaporator should be defrosted often to keep the frost accumulation down to a minimum.

Restricted air circulation would also permit high refrigerator temperatures while the evaporator temperature is lower. Examine the methods of placing foods in the refrigerator. It may be that important air passages are blocked.

After defrosting, rearranging foods, etc., check the refrigerator temperature after the system has operated several hours. It should be found satisfactory.

(Concluded on Page 17, Column 1)

## Type '1D' Flooded System

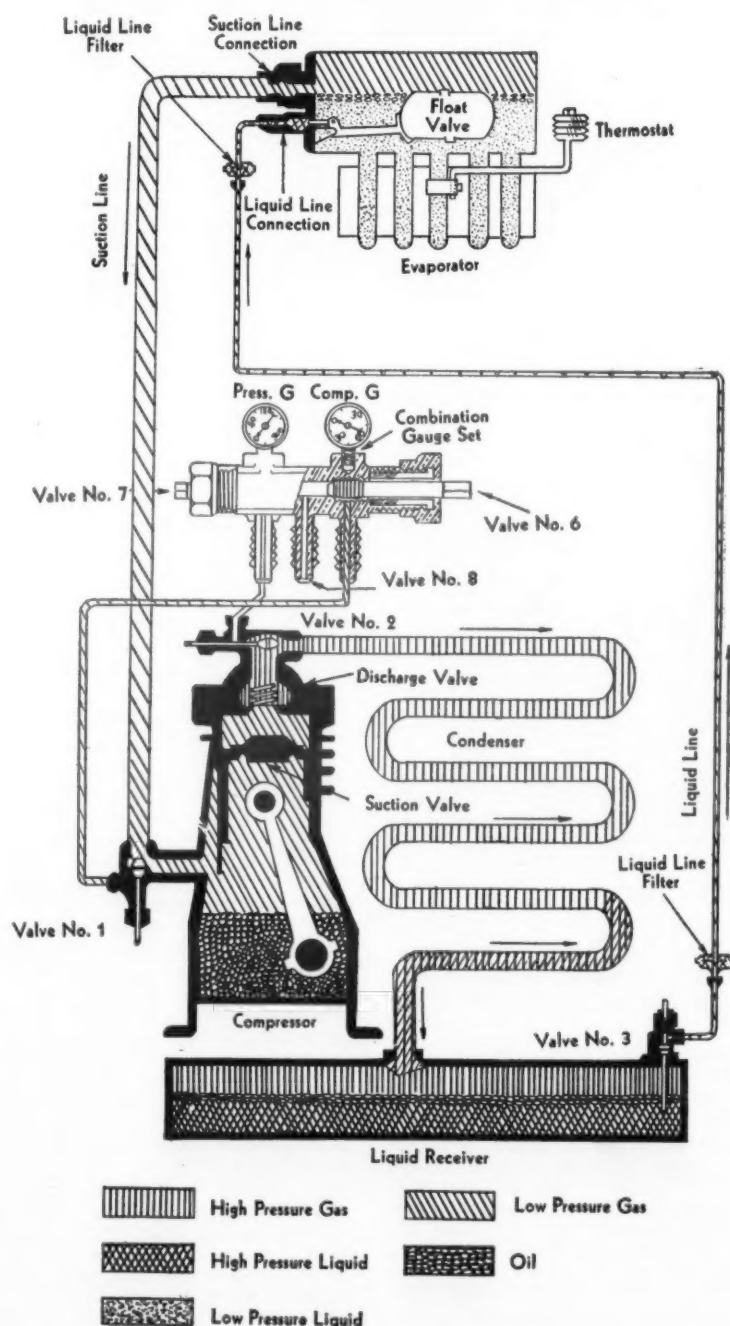


Fig. 138—Type "1D" flooded system using low side float valve, thermostatic control, and having the evaporator not equipped with service valves.



## Common Service Complaints on Type '2A' Flooded Household Systems

(Concluded from Page 16, Column 5)

### Complaint No. 7:

#### Food Has Peculiar Taste

This complaint is the same in any system and is covered in complaint No. 7 under type "1A" system.

### Complaint No. 8:

#### Motor Starts and Stops too Much

Check the thermostat to see that the bulb has good contact with the evaporator. Poor contact might cause erratic operation.

Check the cutting in and cutting out temperatures of the thermostat by placing a thermometer in direct contact with the thermostatic bulb. The operating range may be too close and should be widened.

A loose electrical connection which could be affected by vibration may be making and breaking, starting and stopping the motor.

If unable to obtain the correct cycle with the present thermostat it should be replaced with one having the proper temperature range.

### Complaint No. 9: Blowing Fuses or Overload Relay, Continuous to Cut Out

This complaint would be the same in any type of system and is covered in complaint No. 9 under type "1A" system.

### Complaint No. 10: Compressor Knocks

See complaint No. 5, compressor noisy.

### Complaint No. 11:

#### Compressor Runs Continuously, Noise Inside the Cabinet

See complaint No. 2 and check all possible causes of long or continuous operation described therein.

The noise inside the cabinet may be due to an overcharge of refrigerant, and the accompanying heavy flowing noise through the liquid temperature valve.

The liquid temperature valve may be rattling or chattering, setting up a noise inside the cabinet. Often the rattling is due to vibration.

The cabinet should be properly leveled on a solid floor to reduce cabinet vibration to a minimum. A chattering valve should be replaced with a new valve.

### Complaint No. 12: Refrigerant Leaks When Compressor Is Idle

This complaint would be the same on any type of system and is covered in complaint No. 12 under type "1A" system.

### Complaint No. 13:

#### Food Freezing in the Refrigerator

This complaint would suggest that too much refrigeration is taking place,

which means that the system has the correct amount of refrigerant and is functioning correctly, except that the thermostat is keeping the compressor in operation longer than necessary.

The thermostat should be checked for the proper cutting out temperature. It should be set warmer if necessary to raise the temperature range.

Make sure that the thermostatic bulb is tightly clamped to the evaporator and is making good contact. If the bulb is loose, it will not respond altogether to the evaporator temperature, and may result in freezing refrigerator temperatures.

Stuck closed thermostat contacts will keep the compressor operating continuously.

A grounded control circuit may also keep the motor running continuously even though the thermostat contacts may be open.

If unable to obtain the correct temperature range adjustment on the present thermostat it should be replaced.

### Complaint No. 14:

#### Set Refrigerator Colder

This common complaint may cover a multitude of difficulties, or may be a simple matter of adjusting the thermostat.

Both pressures should be noted on the gauges, and the refrigerator temperature taken in the center of the refrigerator with an accurate thermometer.

The frost condition of the evaporator should be noted, to determine if it is too heavily frosted. Location and placement of the foods should be noted, as they may possibly be restricting circulation.

If the evaporator is heavily frosted, it should be defrosted.

If the air circulation is restricted, the foods and dishes should be rearranged.

If the system is functioning correctly, as may be determined by the operating pressures on the gauges, and the evaporator is not too heavily frosted, and the circulation is unrestricted, and the refrigerator temperature is above 50° F., the control may be set colder.

A complete check-up of all conditions described in complaints Nos. 1 and 2 should be made if it is found that defrosting, rearranging the foods, and setting the control colder does not reduce the temperature to the desired point.

### Complaint No. 15:

#### Machine Will Not Run

This complaint is covered in complaint No. 15 under type "1A" system.

### Complaint No. 16:

#### Refrigerator Not Cold Enough

Check and proceed as in complaint No. 14, setting the refrigerator colder.

### Complaint No. 17:

#### Will Not Freeze Ice

This complaint is covered in complaint No. 17 under type "1A" system.

### Complaint No. 18: Lines Frosting, Water Dripping on Floor

This complaint would indicate that refrigeration is taking place outside of the refrigerator.

First check the suction line. If it is frosted outside the refrigerator there is an overcharge of refrigerant. Refrigerant should be purged from the system until the frost line moves inside the refrigerator, as described under high side float valves on page 83.

With the float valve located in the liquid receiver, and knowing that evaporation starts taking place immediately beyond the float needle and seat, it is apparent that unless provision is made to prevent it, the liquid line will frost during operation.

The liquid temperature valve maintains an intermediate pressure on the liquid in the liquid line to prevent this frosting. If this valve is leaking excessively the intermediate pressure will not be maintained and the liquid line may frost.

As an extra precaution the liquid line is insulated to prevent frosting. If this insulation is removed the line may frost causing water to drip on the floor during the off cycle.

### Complaint No. 19: Refrigerator Motor Causing Radio Interference

This complaint is the same on any type of system and is covered in complaint No. 19 under type "1A" system.

### Complaint No. 20:

#### Motor Running Hot

This complaint is the same on any type of system and is covered in complaint No. 2 under type "1A" system.

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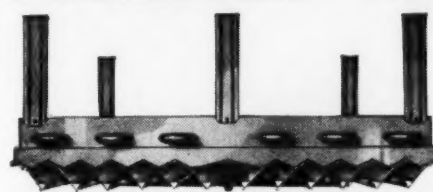
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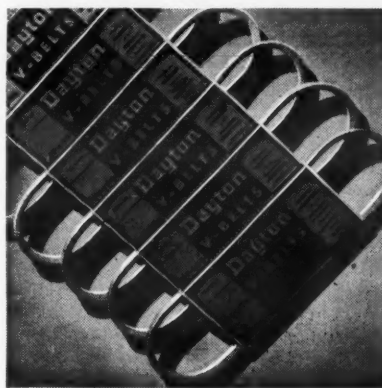
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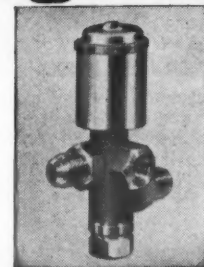
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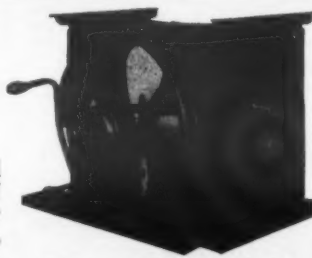
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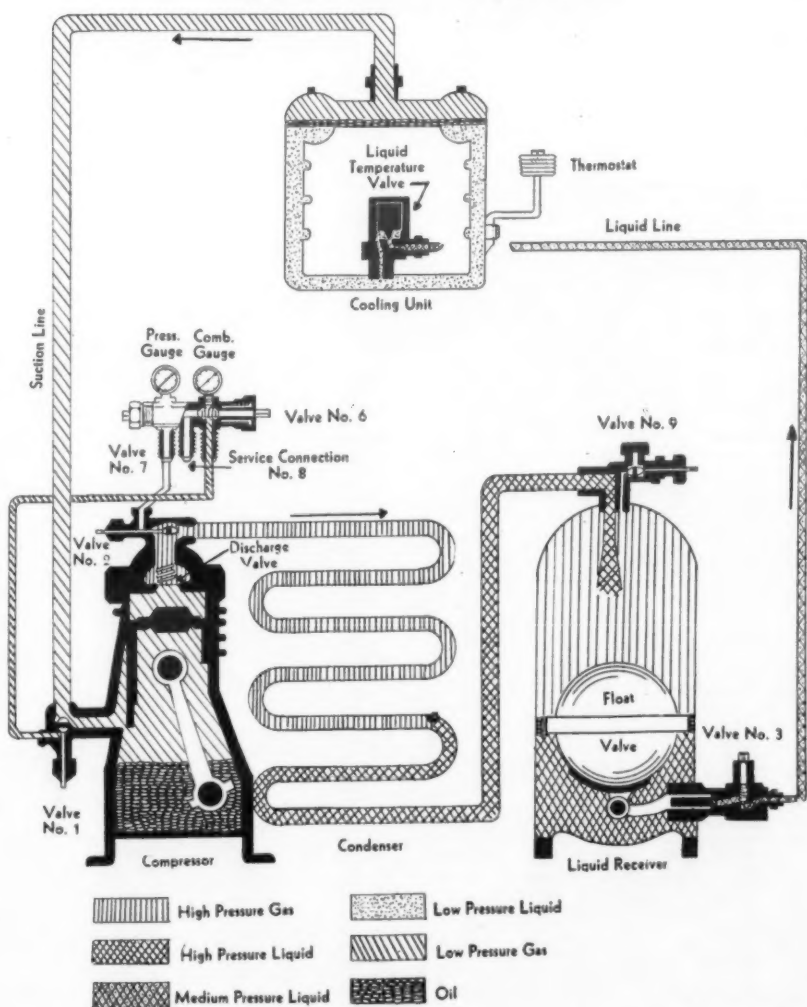


Fig. 145—Key parts of the type "2A" flooded system and its operating cycle are shown in the above drawing.

## Summary of Instalments Published Previously

A summary of previous instalments of the Master Service Manual follows:

### Chapter 1—Theory of Refrigeration (April 10).

### Chapter 2—Principles of Mechanical Refrigeration (April 17).

### Chapter 3—Common Refrigerants (April 24).

### Chapter 4—Condensing Units.

May 1—Description of compressor parts.  
May 8—Stuffing box seals, flywheels, and direct-connected units.

May 29—Rotary compressors.

June 5—Care and servicing of shut-off valves and gaskets.

June 12—Condensers.

June 19—Liquid receivers.

### Chapter 5—Evaporators.

June 26—Flooded evaporators with low side float valve.

July 3—High side float valves and flooded evaporators.

July 10—Automatic expansion valves.

July 17—Automatic expansion valves—continued.

July 24—Thermostatic expansion valves.

### Chapter 6—Controls.

July 31—Low pressure controls.

Aug. 7—Low pressure controls—continued.

Aug. 14—Thermostatic controls.

Aug. 31—Thermostatic controls—continued.

### Chapter 7—Motors.

Aug. 28—Repulsion start-induction run motors.

Sept. 4—Repulsion start-induction run motors (continued) and capacitor motors.

Sept. 11—Direct current motors and belts.

### Chapter 8—Installation.

Sept. 18—Installation of refrigerators.

Sept. 25—Correct use of fittings in making joints.

### Chapter 9—Service.

Oct. 16—Classification of systems and use of combination gauge set.

Oct. 23—Service complaints and remedies on Type 1A flooded systems.

Oct. 30—Service complaints and remedies on Type 1A flooded systems—continued.

Nov. 6—Service operations on Type 1A flooded systems.

Nov. 13—Service operations on Type 1A flooded systems—continued.

Nov. 20—Service Operations on Type 1A flooded systems—concluded.

Nov. 27—Service complaints and operations on Type 1B and 1C flooded systems.

Dec. 4—Service operations on Type 1D and complaints on Type 2A systems.



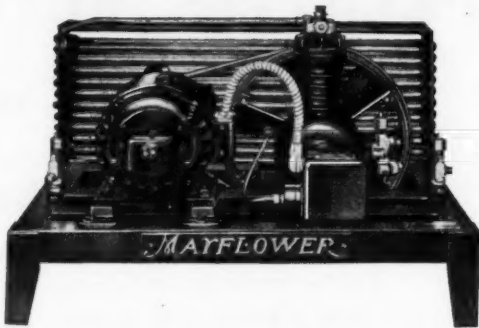
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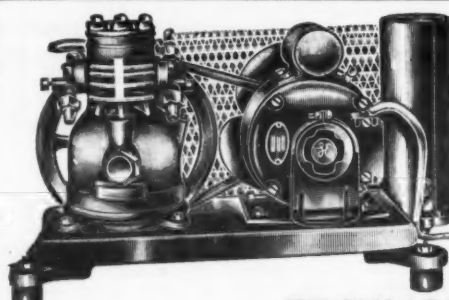
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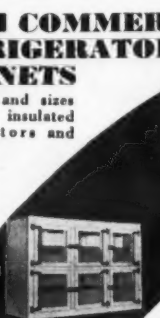
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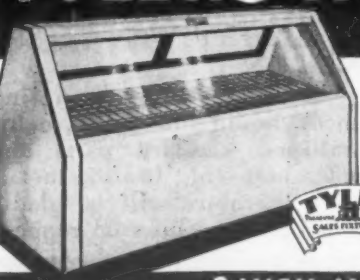


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Thoroughly reinforced all steel attractively  
finished cabinets.

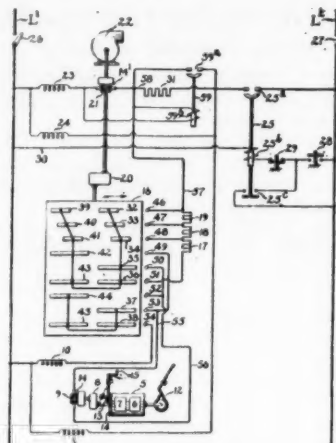
Different models of varying capacities.

Write for details and sales prices.

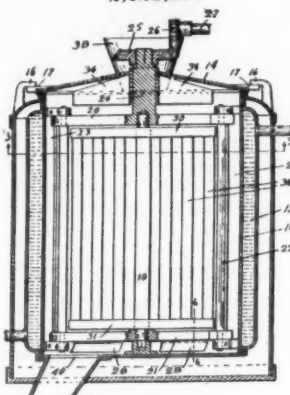
Puro Filter Corporation of America

440 Lafayette Street, New York City

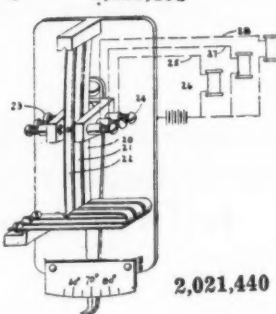
Spring 7-1800



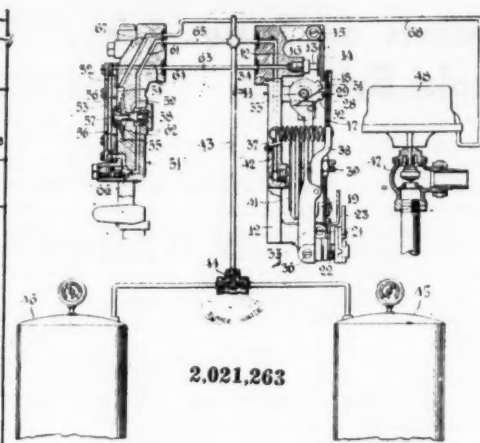
2,021,239



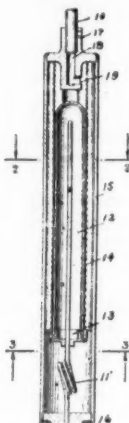
2,021,153



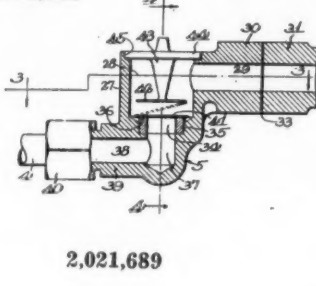
2,021,440



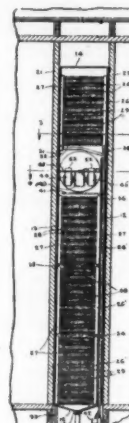
2,021,263



2,021,452



2,021,689



2,021,583

## Exports of Electric Refrigerators

August, 1935, Shipments Reported by the Bureau of Foreign  
and Domestic Commerce, Washington, D. C.

	Electric Household Refrigerators		Electric Commercial Refrigerators Up to 1 Ton		Parts for Electric Refrigerators	
	Number	Value	Number	Value	Number	Value
Austria	41	\$ 3,088	14	\$ 1,105	1,649	\$ 6,614
Belgium	152	11,017	29	2,294	1,978	6,614
Bulgaria	2	175	...	...	4,277	1,224
Czechoslovakia	2	...	...	...	1,224	348
Denmark	...	...	...	...	1,224	348
Finland	...	...	...	...	1,224	348
France	584	38,988	350	24,403	41,043	18,152
Germany	27	1,672	57	8,907	566	112
Gibraltar	5	1,035	4	608	591	112
Greece	11	7,519	15	1,040	591	112
Irish Free State	81	7,577	50	4,946	11,240	...
Italy	87	...	...	...	...	...
Latvia	1	52	...	...	...	...
Lithuania	1	12	...	...	...	...
Netherlands	131	11,898	72	6,813	5,492	3,386
Norway	28	3,081	8	988	110	137
Poland & Danzig	1	106	...	...	1,372	1,000
Portugal	21	2,433	1	288	...	...
Rumania	31	5,870	...	...	...	...
U.S.S.R. (Russia)	...	...	...	...	...	...
Europe & Asia	5	525	...	...	...	...
Spain	116	9,316	55	7,261	2,320	16,672
Sweden	264	19,206	12	1,103	5,220	...
Switzerland	83	5,229	...	...	...	...
Albania	1	99	...	...	...	...
United Kingdom	953	62,163	75	7,044	68,293	...
Yugoslavia	1	91	...	...	...	...
Canada	134	9,830	77	7,554	27,884	75
Costa Rica	2	196	...	...	...	...
Guatemala	4	687	...	...	...	...
Honduras	16	1,970	...	...	...	...
Nicaragua	1	1,004	...	...	...	...
Panama	89	9,492	18	3,840	2,671	331
Salvador	3	303	11	737	7,186	15
Mexico	319	29,846	11	2,603	451	5
Newfoundland & Labrador	...	...	...	...	...	...
Bermuda	65	6,098	4	1,256	522	115
Barbados	17	1,086	...	...	...	...
Jamaica	2	212	...	...	...	...
Trinidad & Tobago	16	1,322	2	435	55	9,443
Other British West Indies	5	377	...	...	...	...
Cuba	108	9,125	30	3,815	238	333
Dominican Republic	20	1,992	1	184	135	123
Netherlands West Indies	57	4,825	2	...	14,523	...
French West Indies	15	1,937	...	...	...	...
Haiti, Republic of	23	1,775	1	110	7,831	648
Argentina	24	2,310	134	9,112	53	10
Bolivia	1	178	...	...	...	...
Brazil	129	9,145	39	3,495	39	1,019
Chile	57	4,608	15	1,256	819	1,305
Colombia	218	17,776	9	2,572	45	1,604
Ecuador	5	519	...	...	...	...
British Guiana	...	...	...	...	...	...
Surinam	...	...	...	...	...	...
Peru	88	9,453	7	1,796	1,355	45
Uruguay	5	337	11	841	1,355	45
Venezuela	140	11,686	2	521	1,355	45
Aden	1	90	...	...	...	...
British India	203	17,889	53	6,230	14,604	1,223
British Malaya	93	8,632	4	781	586	1,100
Ceylon	22	1,622	12	880	2,905	...
China	51	5,982	4	297	...	...
Netherlands India	219	17,547	17	2,291	496	333
French Indo-China	...	...	...	...	...	...
Hong Kong	45	6,055	3	1,779	1,355	45
Japan	6	769	21	1,943	1,355	45
Kwantung	6	425	...	...	...	...
Palestine	62	5,325	94	11,899	8105	2,755
Philippine Islands	67	6,656	11	1,771	...	...
Siam	10	609	2	730	...	...
Syria	7	574	3	1,064	...	...
Turkey	13	1,035	5	776	...	...
Australia	1,040	73,506	42	5,006	27,685	...
British Oceania	...	...	...	...	...	...
New Zealand	475	38,190	129	14,693	4,928	148
Belgian Congo	17	1,819	...	...	...	...
British East Africa	23	1,524	...	...	...	...
Union of South Africa	2,649	227,656	73	8,918	17,755	...
Other British South Africa	24	2,115	...	...	...	...
Gold Coast	15	1,150	...	...	...	...
Nigeria	1	193	...	...	...	...
Other British West Africa	2	224	...	...	...	...
Egypt	77	5,640	6	1,132	1,074	2,606
Algeria & Tunisia	44	3,957	29	2,910	...	...
Madagascar	1	114	...	...	...	...
Other French Africa	43	3,922	...	...	...	...
Italian Africa	20	2,079	2	118	...	...
Morocco	21	1,355	1	107	...	...
Mozambique	3	275	...	...	...	...
Canary Islands	38	2,826	...	...	...	...
Other Spanish Africa	6	462	...	...	...	...
<b>Total</b>	<b>9,499</b>	<b>\$769,679</b>	<b>1,646</b>	<b>\$174,391</b>	<b>\$361,345</b>	
Shipments to Hawaii	548	69,668	57	6,302	4,742	...
Puerto Rico	457	45,655	29	4,501	3,745	...
Virgin Islands	...	...	...	...	47	...

## PATENTS

Issued Nov. 19, 1935

2,021,153. ICE CREAM FREEZER. Albert F. Sawyer, Haverhill, Mass., assignor to Irving L. Keith, Haverhill, Mass. Application Oct. 19, 1934. Serial No. 749,080. 15 Claims. (Cl. 259-99.)

2,021,239. ELECTRIC MOTOR CONTROL SYSTEM. Ralph G. Lockett, Wauwatosa, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis., a corporation of Delaware. Application Feb. 1, 1935. Serial No. 4,457. 8 Claims. (Cl. 34-5.)

2,021,263. REVERSIBLE THERMOSTATIC SYSTEM. Carl A. Otto, Milwaukee, Wis., assignor to Johnson Service Co., Milwaukee, Wis., a corporation of Wisconsin. Application Oct. 5, 1932. Serial No. 636,418. 6 Claims. (Cl. 236-1.)

2,021,440. THERMOSTATIC DEVICE. Harry Wheeler, Tenafly, N. J., and Brian Wheeler, Erie, Pa. Application April 20, 1933. Serial No. 666,996. 5 Claims. (Cl. 200-139.)

2,021,452. FILTER. Walter A. Kuenzli and Clyde E. Ploeger, Evansville, Ind., assignors to Servel, Inc., New York, N. Y., a corporation of Delaware. Application April 23, 1932. Serial No. 607,050. 8 Claims. (Cl. 210-112.)

2,021,583. DEVICE FOR CONDITIONING AIR. Frank A. Whiteley, Minneapolis, Minn. Application Sept. 11, 1931. Serial No. 562,249. Renewed Jan. 4, 1934. 13 Claims. (Cl. 257-8.)

2,021,689. CHECK VALVE FOR REFRIGERATING SYSTEMS. James D. Jordan, Elmhurst, Ill., assignor, by mesne assignments, to General Household Utilities Co., Chicago, Ill., a corporation of Delaware. Application March 20, 1933. Serial No. 661,661. 4 Claims. (Cl. 62-115.)

### Boyle Opens New Branch Store in Preston, Idaho

PRESTON, Idaho—Boyle Furniture Co., dealer handling the Leonard electric refrigerator in the inter-mountain territory, has opened a new branch store here, with George W. Evans as manager.

Modern in every respect, the new store is said to be one of the most attractive appliance stores in this section. It is one of four branch stores of the Boyle Furniture Co., and handles only electric appliances.

Main store of the Boyle company is at Ogden, Utah, and other branches are located in Salt Lake City, Brigham City, and Logan.

### Thomas Writes Radio Travel Book for Crosley Dealers

CINCINNATI—A radio travel book, written by Lowell Thomas, world traveler and noted commentator, is part of the three-piece direct mail campaign for use by dealers, recently released by the Crosley Radio Corp., here.

This booklet contains interesting facts about different countries in the world and their broadcasting stations. It gives suggestions on how to dial and tune in on distant stations, where to look for police, weather, amateur, and ship broadcasts, in addition to the American and foreign broadcasts.

### INFORMAL TALK NUMBER 27



### No Sleuthing Needed to Find Profit in Trained Men

Even Sherlock Holmes couldn't recover the profit lost through improper installations and service and incompetent service men. A job done wrong—a customer peeved—wasted time—are profit thieves. But "properly" trained service men insure profits, customers and friends.

Dealers... Distributors... interested in obtaining "properly" trained men for installation and service work... ambitious men... who are interested in a future in this big new industry... GET THE FACTS. Write for details of R-A-C-I training and a list of the manufacturers who endorse it and furnish factory engineers to supervise it.

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for  
**AIR CONDITIONING**



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TO THE REFRIGERATION INDUSTRY

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100%  
WHOLESALE  
We Protect the Dealer

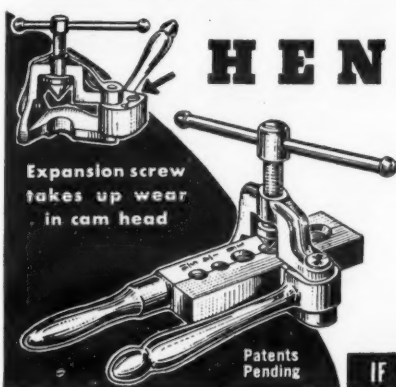
You can always depend on us for lowest prices and speedy service. Our big catalog showing America's largest line free to all legitimate dealers and service companies. Write today on your letterhead.

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### HENRY FLARING TOOL

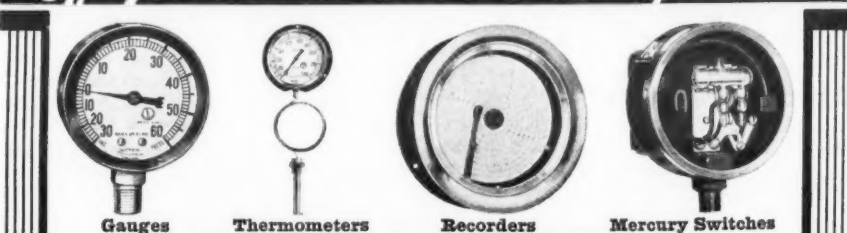
The flaring tool that is the fastest and easiest to operate! Sturdy and lasts longer. Adjustable cam lever locks the tube in place in carbonized clamping blocks. Greatest locking pressure is always exerted directly opposite the tube. For 1/4", 5/16", 3/8", 1/2" and 5/8" tubing. Each, \$4.55.

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	United States and Possessions, and Pan-American Postal Union Countries	All Other Countries (except Canada)	Canadian Rates (including tariff of 5 cents per copy on the News)
Electric Refrigeration News			
1 subscription	\$3.00	\$5.00	\$8.00
5 or more each	2.75	4.75	5.75
10 or more each	2.50	4.50	5.50
20 or more each	2.25	4.25	5.25
50 or more each	2.00	4.00	5.00
1935 Refrigeration and Air Conditioning Directory or 1935 Refrigeration and Air Conditioning Market Data Book or Master Electric Refrigeration Service Manual (to be published Jan. 1, 1936)			
1 copy	\$3.00	\$3.50	\$3.50*
5 or more each	2.75	3.25	3.25*
10 or more each	2.50	3.00	3.00*
20 or more each	2.25	2.75	2.75*
50 or more each	2.00	2.50	2.50*

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Electric Refrigeration News and any 1 book	5.00	7.50	9.00*
All 3 books	6.00	7.50	7.50*
Any 2 books	5.00	6.00	6.00*
Any 1 book	3.00	3.50	3.50*

\*Canadian subscribers are required to pay a tariff and excise tax on the Directory, Market Data Book, and the Master Service Manual of approximately 50 cents per book. These charges on books will be collected by the Canadian postoffice at the time of delivery.

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5229 Cass Ave., Detroit, Mich.

Date.....

- ☐ Enter my subscription to Electric Refrigeration News for one year (52 issues). Enclosed find remittance.\*
- ☐ Enter my subscription to Electric Refrigeration News for one year (52 issues), and send me one of the above books. State which (.....) Enclosed find remittance.\*
- ☐ Enter my subscription to Electric Refrigeration News for one year (52 issues), and send me two of the above books. State which two (.....) Enclosed find remittance.\*
- ☐ Enter my subscription to Electric Refrigeration News for one year (52 issues), and send me all three of the above books—the Directory, the Market Data Book, and the Master Service Manual. Enclosed find remittance.\*
- ☐ Enter my advance order for the Master Service Manual, to be published about Jan. 1, 1936, and send me a free copy of the 112-page booklet containing the first six chapters as published in the weekly issues of Electric Refrigeration News from April 10 to Aug. 21, 1935. Enclosed find remittance.\*

\*See rates above.

Name.....  
Attention or }  
In care of }

Street.....

City..... State.....

Remarks.....  
(Please indicate products sold or principal line of business.)

12-4-35

## QUESTIONS

### Industry Sales for 1934

No. 2585 (Reader, Minnesota)—“I have looked through my past issues of ELECTRIC REFRIGERATION NEWS, but in moving some of these have become misplaced.

“What I am after is some statistics covering the sale of electrical refrigeration for the year 1934. If this has been published by you, can you send us this information?”

Answer: All available statistical data on the electric refrigeration and air-conditioning industries are published in the 1935 REFRIGERATION AND AIR CONDITIONING MARKET DATA BOOK. Information in this book includes data on sales by years, figures on wired homes, and saturation on household electric refrigerators by areas, consumer's surveys in various major cities, and an analysis of distributive channels.

### Parts Manufacturers

No. 2586 (Manufacturer, Illinois)—“Can you put me in touch with manufacturers of standard parts such as compressor, condenser, expansion valves, temperature or pressure control devices (thermostats), and coin meter boxes.

“Are you aware of any present-day compressor that operates successfully on ethyl chloride? What gases seem to be giving best results from service standpoint (assembly) where there is not a wide variation in maintained temperature?”

Answer: A complete list of all manufacturers of refrigeration equipment, parts, materials, and supplies is published in the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

This book is divided into four sections: (1) alphabetic list of manufacturers; (2) index of trade names; (3) classified list of refrigeration equipment; (4) geographical directory, giving name, address, telephone number, products, and executive personnel of the various manufacturers.

We do not believe any manufacturers are employing ethyl chloride in systems being made today. Methyl chloride and sulphur dioxide predominate in commercial applications.

### Data on Dry Ice

No. 2587 (Emergency Relief Administration, Puerto Rico)—“We are planning to give an agricultural exhibit in the various towns of Puerto Rico and would appreciate it if you could get us in touch with some concerns where we could obtain the following information:

“1. A complete set of realistic dummies of the various cuts of meat to show the American method of cutting and preparing.

“2. A large colored chart showing where and how to cut up a beef, goat, or hog.

“3. Information on dry ice and dry ice containers; their use and cost.”

Answer: Concerning information on cuts of meats, we suggest that you write the Institute of American Meat Packers, 506 S. Wabash Ave., Chicago, Ill. They can either supply this material or tell you where it can be obtained.

For information on dry ice you might write the Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago, Ill. This company is a leading manufacturer and distributor of dry ice.

### Air-Conditioning Tests

No. 2588 (Manufacturer, Wisconsin)—“On page 12 of your Nov. 20 issue you carry a reprint of ‘Standard Methods for Rating and Testing Air Conditioning Equipment.’

“Could you kindly inform us where complete copies of these standards may be obtained?”

Answer: Complete text of the “Standard Methods of Rating and Testing Air Conditioning Equipment” was published in the Nov. 20 and 27 issues of ELECTRIC REFRIGERATION NEWS. For further information regarding these standards, address William Henderson of the Air Conditioning Manufacturers Association, Southern Building, Washington, D. C.

### Westinghouse Service

No. 2589 (Service Man, New Jersey)—“Could you tell me how or where I

can find out how to change a 110-volt d.c. Westinghouse sealed unit, which employs a converter, into a 110-volt a.c.? There are three wires coming from the sealed motor to terminals on outside of motor which leads one to believe the changes necessary for 110 volts a.c. can be made at this point.”

Answer: We cannot give you information on the wiring of the Westinghouse sealed unit to which you refer. We suggest that you contact the Electric Equipment Corp., 1005 Broad St., Newark, N. J., the Westinghouse distributor nearest you, for information on the hookup to the terminals which you mention.

### Petroleum Machines

No. 2590 (Dealer, Spain)—“Through the courtesy of the Stewart-Warner Corp. of Chicago, we were informed that you and your magazine are well-known in the field of refrigeration; as we are very interested in making arrangement with a firm which manufactures refrigerators which operate by petroleum, we beg you to give us information about the matter.”

Answer: Manufacturers of kerosene-operated refrigerators are as follows: Electrolux Refrigerator Sales Division of Servel, Inc., Evansville, Ind.; the Crosley Radio Corp., Arlington St., Cincinnati, Ohio; and the Gibson Electric Refrigerator Corp., Greenville, Mich. There is also a gasoline motor-driven refrigerator, which is manufactured by the Waukesha Motor Co. of Waukesha, Wis.

### History of Industry

No. 2591 (Reader, Canada)—“The office of Frigidaire here suggested that you could give me some information I very much desire of the figures of the history of the development of electrical refrigeration business.

“What I want specially are the number of units sold and cash amount of business for each of the years to date for the United States and Canada, and also total world sales if convenient.”

Answer: All available statistical data concerning the electric refrigeration and air-conditioning industries are published in the 1935 REFRIGERATION AND AIR CONDITIONING MARKET DATA BOOK. This includes sales by years by United States manufacturers in number of units and dollar volume.

We do not, however, have the sales figures for Canada. Exports of American manufacturers of refrigerators to Canada are given in two ways: (1) in the tabulation of sales by members of the Refrigeration Division of the National Electrical Manufacturers Association, in which sales to Canada are reported separately; and (2) in the total exports of refrigerators made public each month by the U. S. Bureau of Foreign and Domestic Commerce.

One Canadian manufacturer told us that sales of household electric units in Canada during 1934 totaled 27,000 units. We published this figure informally, and it has not been disputed.

### Alumilite Process

No. 2592 (Distributor, Italy)—“I am in receipt of your esteemed favor of Oct. 31, and beg to enclose herewith, cheque on Banca Commerciale Italiana for \$5.00 (five dollars) being one year subscription to the ELECTRIC REFRIGERATION NEWS.

“Meantime, I take the liberty to ask you, Dear Sirs, to let me have if possible, some informations about ‘Alumilite process’ mentioned on page 10 of your Oct. 16 issue of REFRIGERATION NEWS.

“In case you are not in a position to do so, kindly address me to the proper firm which can inform me about this new process.”

Answer: For information concerning the Alumilite process, address Murray V. Churchill of the Aluminum Co. of America, Pittsburgh, Pa.

### Manual for Mechanics

No. 2593 (Dealer, Illinois)—“Please send us list of books with publishers concerning electric refrigeration mechanics.

“These are for a young fellow through high school, naturally handy, but who never has studied the subject.”

Answer: The MASTER SERVICE MANUAL, to be published about Jan. 1, 1936, will contain complete information on the installation and servicing of all the fundamental types and varieties of electric refrigerators.

Detailed instructions regarding the methods of handling each of the problems most commonly encountered in practical experience will be published in this book.

## CLASSIFIED

RATES: Fifty words or less, one insertion \$2.00, additional words four cents each. Three insertions \$5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

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### SERVICE MEN WANTED

NATIONAL Sales Organization, selling electric water coolers and drinking fountains combined, and electric refrigeration, desires contacts with service organizations in every locality in the United States. Write stating qualifications, and prices for service, to L. K. McDorman, 613 Fifteenth St., N.W., Washington, D. C.

### EQUIPMENT FOR SALE

MANUFACTURERS OVERSTOCK: New six hole double ice cream cabinets, stainless tops, portable or remote control. Quantity limited. Priced at \$55.00 for quick disposal. 1/2 HP new Servel units for above at \$40.00 less motor. Extra special, 1 HP Frigidaire, rebuilt and guaranteed, \$95.00. Send for bargain list of new coils. Pioneer Refrigeration Equipment Co., 33 Warren St., New York City.

### PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. Van Deventer (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

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HALELECTRIC thermostat repair service. B & B, G.E., Cutler-Hammer, Penn. Ranco, Tag, etc. Expansion valves repaired. Gas service, Ethyl, Methyl, Iso-Butane, Sulphur. Your cylinder or ours. Competitive prices. Halelectric Laboratory, 1793 Lakeview Road, Cleveland, Ohio.

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GENERAL ELECTRIC SEALED UNITS—repaired, rebuilt, exchanged. Guaranteed service. Our modern shop is especially equipped to efficiently repair these units. Prices low and workmanship the best. Give model number when writing. Immediate service. Rex Refrigeration Service, 446 East 79th St., Chicago.

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REFRIGERATION-AIR CONDITIONING. Learn installation, servicing, estimating and engineering sales in a resident school. Modern class rooms, competent instructors, well equipped laboratories with domestic and commercial refrigeration and air conditioning equipment for students to work on. Thorough, practical training. Detroit School of Refrigeration, 6517-6519 Grand River Ave., Detroit, Mich.

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